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PROCEEDINGS

# OUTLOOK '84

60 YEARS OF SERVICE TO AMERICAN AGRICULTURE



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Agricultural  
Outlook  
Conference

United States  
Department of  
Agriculture

Oct. 31 - Nov. 3, 1983  
Washington,

FAC



# THE AGRICULTURAL OUTLOOK CONFERENCE

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Special thanks also  
to Jane Vaughan  
and Ann Cobb.



December 1983

These published proceedings of the U. S. Department of Agriculture's 60th annual Agricultural Outlook Conference contain all papers submitted by those who participated in the program. Additionally, transcriptions of several speakers' comments also are provided. Please bear in mind that these are actual transcriptions of the spoken word and, thus, may not read as smoothly as a prepared written text. Regardless, the important substance of these remarks is retained intact, and we believe providing this in transcribed form is better than having no record at all.

Outlook '84 took place October 31 - November 3 in Washington, DC and drew more than 1,375 people to its 36 sessions. In addition, 900-line telephone service was instituted this year with nearly 900 callers taking advantage of the opportunity to hear Outlook '84 speakers "live." In many cases, one 900-line call was relayed to as many as 500 more listeners, either in auditoriums or via other means of telecommunication. Our appreciation for the impact of this service can be measured by our having applied for the same hook-ups at Outlook '85.

All those who receive this publication will be sent preliminary information about next year's Outlook Conference in late August 1984. The dates for Outlook '85 are tentatively set for October 29 - November 1, 1984.

Thank you for your interest in USDA and the annual Outlook Conference.

Best wishes for the holiday season and the new year.

JAMES R. DONALD  
Chairman  
Steering Committee

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Secretary of Agriculture John R. Block

1984 Agricultural Outlook Conference - Session 1

For Release: Monday, October 31, 1983



Good afternoon . . . I'm glad to see all of you here today. It's a pleasure to welcome you to the 60th Annual Agricultural Outlook Conference. And that is why I am certain we will all find the conference one of the most informative and important single events the Department sponsors.

The objectives of this conference have not changed in sixty years. The main purpose is to provide information on the current and probable conditions which are impacting the agricultural sector. It is not intended to answer all your questions but rather to challenge your genius.

President Reagan has often said that the real thrust in this country's recovery would come from the genius of the American people themselves. I share that belief.

Today, perhaps more than at any time in recent history, we need to be challenging the course of U.S. agriculture. Last year when I opened this conference, I reviewed the developments of the 1970s and early '80s that had created the current dilemmas for agriculture. At that time I stated that agriculture, along with the policies and programs which surrounded it, were approaching a crossroads. While recent events may have slowed the approach, nothing has fundamentally changed the collision course we are on.

Late last year, it was apparent that some decisive action was necessary to relieve the economic pressures on the farm sector. In January 1983, President Reagan announced the implementation of the payment-in-kind program to reduce production and burdensome stocks.

The response from farmers was phenomenal. Their willingness to be part of a temporary adjustment program turned this untested proposal into the most effective acreage reduction program in history. Without a doubt, this program has been a key factor behind the major improvement we have seen in economic conditions.

But these improvements should not overshadow the fact that the issues facing agriculture have not changed. The events of the past year have bought time for most of our farmers, but the drought and related developments have financially overwhelmed some. We must use the time we have very wisely.

Keep this in mind, the payment-in-kind program was never intended as a permanent solution. As a farmer myself, I can tell you that idling productive acreage is not an option that U.S. farmers prefer. American farmers pride themselves on their ability to produce, and they want their income from the marketplace -- not from the Treasury. Continued acreage adjustment programs are simply not the type of programs that a market-oriented agriculture needs.

We still need further immediate actions to prevent agriculture from sliding back into the problems of the past few years. This is why I continue to be very disappointed by the failure of the Congress to take action on target price legislation. Agriculture's problems have not gone away. And it is irresponsible for anyone to sacrifice the future prosperity of this industry.

In July I convened an Agricultural Summit with the leadership representing the broad spectrum of the agriculture and food system. There were many issues discussed at the Summit. Many ideas and opinions were expressed. Let me reiterate what I perceive to be the most significant ones.

The participants at the Summit strongly agreed that we need to come up with an agricultural policy that is not dominated by recent or current events--but rather a long-range, comprehensive plan for food and agriculture that will provide for consistency. The over-whelming majority were also of the opinion that this plan should be market-oriented and that domestic policy should not be separated from international agricultural policy.

Agriculture is a global industry. The increasing interdependency of U.S. and world agriculture dictates that we consider seriously, not only the opportunities that exports bring to the agricultural industry, but also the consequences of increased competition for world markets and how to respond to that competition.



It was also well accepted at the Summit that conservation of our soil and water resources should be a high priority and, in fact, that this is an issue of grave concern. We must preserve our greatest natural resources.

A major point made at the Summit was that there is the need for a less rigid agriculture and food policy. Numerous events outside the agricultural community's control -- world recession, international monetary developments, inappropriate fiscal policies and drought, just to cite a few examples--make it important that agricultural policies be flexible and that sufficient discretion is provided to make necessary adjustments.

A final theme that emerged over and over at the Summit was the need to expand markets. Many of the participants felt that it would require a comprehensive strategy to increase export demand for U.S. agricultural products. My recent South American trip was aimed at this goal.

On returning from this trip, I reflected on the tremendous strides that had been made in agriculture for many of those countries in recent years. The vast agricultural potential of such countries as Brazil and Argentina confirmed my belief that world agriculture is becoming increasingly more efficient. This means world markets will continue to get more competitive. It also confirmed my belief that world and domestic agricultural policies have become practically inseparable.

Many of these countries have discovered agricultural exports to be a valuable source of hard currency, and thus, an effective option in relieving debt servicing pressures. At the same time, the general development of many of these countries and the improvement in their agricultural infrastructures reassured me that the potential for world markets will continue to grow. It means that U.S. agriculture will be challenged in the international marketplace. But the opportunities are tremendous if we utilize our comparative advantages.

I am proposing, as I have always done since becoming Secretary, that we increase the degree of market-orientation in U.S. agricultural policy. I am not proposing that we get government entirely out of agriculture. A safety net of some kind is necessary. I am just saying that the government does a poor job of allocating resources. Government is ill-equipped to accurately set prices. The true signal that farmers should respond to are market forces undistorted by government interference.

Instead of losing markets, we need to be expanding the demand for U.S. agricultural products. We possess the most efficient agricultural machine in the world. The U.S. has the largest contiguous expanse of fertile, productive land in the world, and a temperate climate unequaled anywhere.

We also have the world's most developed and competitive agribusiness infrastructure, including farm input suppliers, elevators, and our systems of transportation, processing, marketing and retailing. The facts support the efficiency of U.S. agriculture relative to our competitors. In 1982, U.S. yields for coarse grains were almost three times as great as those of other major exporters, and soybean yields over a fourth greater.

Growth in our agricultural markets would promote even further efficiency, another advantage of a more market-oriented policy. Productivity in agriculture is still increasing rapidly compared to the rest of the U.S. economy. But economic efficiency, which is high on our list of goals for agriculture, requires that products be produced and marketed in the quantities and at a price level determined in the marketplace. Technical efficiency must also be a goal for our agricultural system. Policies to encourage adoption of appropriate technologies need to be supported.

The Department needs to be more consistent in its agricultural policy to achieve the efficiency goal, and a stronger market-orientation will help accomplish this. To date, the Department has been at odds with itself on the efficiency goal. Through its agricultural research and extension activities, USDA has contributed substantially to the productive efficiency of farmers. We have also made major contributions to orderly and efficient marketing of agricultural commodities. We provide timely and accurate information throughout the distribution system, and assist farmers in establishing markets and market information.

However, we then turn around and implement programs designed to throttle down our productive capacity. We do it at great expense, at a time when budget deficits are a concern to everyone.

And even, here, we are inconsistent. Target and loan prices above market clearing levels are telling producers in this country and other countries to expand production! This is happening at the same time PIK and other acreage reduction programs are telling U.S. farmers to cut back!

We are encouraging foreign production at the expense of our trade shares. History has shown the long-term effects of such policies. In the late 1920's the United States produced a yearly average of 14.4 million bales of cotton, more than the rest of the world combined. In 1983, after 50 years of curtailed acreage, the U.S. is expected to produce only 8.4 million bales. Meanwhile, foreign production has increased to 58 million bales, about seven times as much as the United States.

We are now the third largest producer of cotton and our restrictive policies have given encouragement to man-made fibers. Our policies increased incomes in the short run, but the industry is declining. A more market-oriented approach would lessen, if not eliminate, these inconsistencies.

Agriculture currently makes a substantial contribution to the U.S. economy. A final advantage of a more market-oriented approach is that rather than restrain this contribution, such an approach would unharness our ability to produce more, and produce it more efficiently. Even now, the food and fiber sector contributes over 20 percent of the U.S. Gross National Product. Nearly 25 percent of the U.S. labor force is employed in agriculture and the agribusiness sector. Agribusiness accounts for more than 50 percent of the combined assets of the manufacturing, wholesale and retail industries in the country. But perhaps the most telling statistic in relation to an improved agricultural economy is this: A \$1 increase in net farm income can boost nonfarm income \$4 -- if it is caused by a growth in demand. Thus, a 20 percent increase in net farm income could boost total GNP by \$18 billion, the equivalent of over one million jobs.

The advantages of expanding our export markets and unleashing our agricultural producers are unmistakably clear. There are a lot more people than just farmers that have a stake in what happens to our Nation's agriculture.

This conference offers the opportunity to examine not only issues confronting selected commodities, but also the broader issues which will affect all facets of agriculture. Additionally, you will be able to gain a greater understanding of the policies of our major foreign customers and competitors. You will hear how our policies are viewed from their standpoint.

You will be able to revisit past farm programs and policies with former Secretaries of Agriculture. Finally, you'll review the policy agenda for the future. I encourage all of you to become a part of the dialogue that will continue until we have put agriculture permanently on course toward a lasting prosperity.

Agriculture must carefully examine the options as it confronts the difficulties it faces both domestically and internationally. Agriculture has always been a cornerstone of this Nation's economy. We must choose our course carefully if we are to keep the Nation strong.

Thank you.

#

Robert J. Dederick, Executive Vice President  
and Chief Economist, The Northern Trust Co.



A transcription of remarks made Monday, October 31, 1983  
Session 3 - Annual Agricultural Outlook Conference

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Well, let me thank you, Dawson, and say good  
afternoon, farming followers. Before proceeding, I should  
first like to say what it is a pleasure it is to be with  
you here in the nation's capital

-- but, honesty  
forbids.

But, lest you take umbrage -- that's a term we use  
in the banking field: umbrage --  
let me explain.

The reason for my unhappiness, other than the fact  
that I'm not getting paid for this effort, and soon you'll  
know why, is that I made the mistake of speaking at  
the annual meeting of the American Agricultural Economic  
Association last summer at Purdue. Thus, some of you --  
those of you who didn't check the program in advance  
may have heard me at that time.

And, at this stage of the business cycle what  
was a reasonable thing to say last August still seems to  
be a reasonable thing to say today, at least if you  
haven't done any work in the interim.

60th ANNUAL AGRICULTURAL OUTLOOK CONFERENCE • USDA  
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60 YEARS OF SERVICE TO AMERICAN AGRICULTURE



So, there's a strong probability that some of you will be hearing some Dederickisms today that you first heard last August. I shall forgive you, therefore, if you treat them with the utter lack of respect which they deserve--certainly that was the way you treated them last summer.

Now, as Dawson as told you, I -- incidentally, we think pretty highly of George Ozzie over in Commerce you know. We're not so sure we would automatically give you number one.

As Dawson has told you, I no longer work in this delightful town. When it was announced to the press that I was leaving, it came as quite a shock to the reporters. Most of them didn't know I had been here. But, I was, and during my stint in what we participants like to call the public service -- others have a different name for it -- I worked for Malcolm Baldrige. Perhaps the only cowboy ever to graduate from Yale.

And, while I no longer am one of Mac Baldrige's hands, he has left his brand upon me and as you may know he is a man who abhors fuzziness in language and broad generalizations in presentations.

His mandate is, be crisp and be explicit. Well, too many years in the economics trade have just about ruined me on the first score. Windy, yes; crisp, no. But, thanks to Mac Balderidge, I do try to be precise, more or less.

And, for the benefit of you out there who will be more concerned, really, about how rapidly I'm moving to the end of my remarks today than about what I actually have to say--in other words, most of you--and me, too, for that matter--I'll tell you that I shall be making about seven precise points in, of course, a windy way.

Now, I shall start -- I gave it some thought, and decided that I would start with precise point number one. It took a while but I came up with that one, and this one is that the U.S. business recovery is proceeding more vigorously than expected.

As usual, economists--myself included--make a career out of underestimating recoveries; that is, when we're not underestimating recessions, at least if we're in the government, and that's the norm. And, our only consolation is the fact that non-economists underestimate and mistime even more than we do even though they usually forget to tell us, at least if we work for them.

I have my own water here, Dawson.

MR. AHALT: Oh, excuse me:

MR. DEDERICK: It's nice of you though.

Now, when it all began this time, indeed even after it all began, the conventional message in Washington and elsewhere was that this would be a sub-par recovery--or, we call it moderate, of course, rather than sub-par, on the grounds that this is what government policy was aimed at, and be, despite the fact that government -- it

never works out that way in practice --that whatever government wants, government gets.

But, sub par it hasn't been. On the contrary, it's been just about in line with a post-war norm which as measured by the Commerce Department's real GNP -- we tend to get possessive about those things over in Commerce as measured by that over the past four quarters has been at an annual rate of about  $6\frac{1}{2}$  percent, and I'm including the fourth quarter of 1983 in there.

And,  $6\frac{1}{2}$  percent ain't moderate. As I say, on the contrary, it is just about on the post-war norm.

Now I'd give you some more detailed evidence, but since I have just left Commerce --that's why I was late, incidentally. I went over there and kept waiting for the limosine to pick me up and bring me over here. After 15 minutes I remembered and started trudging over.

But, I went over, in any event, and tried to get some statistics out of them--and they won't give them to me anymore. They've decided not to. And, my new staff hasn't made up its mind whether it's going to do: give me any either. So, I really have to let it go on that-- $6\frac{1}{2}$  percent over the first four quarters of the recovery.

But, of course, since I'm a former high government official, I know you'll take it on faith in any event.

Precise point number two, at least for the foreseeable future, there's no real reason to doubt that the recovery will remain faster than earlier expected.



Now, the foreseeable future isn't as long now as it was a year ago when the recovery was getting underway. That's the norm; the foreseeable future tends to get shorter and shorter as recoveries proceed, but there's still no real reason to think that it won't go out at least to-- pick a date at random--to November 6th, 1984.

And, over that span, I think we can continue to look for a recovery that will be faster than earlier expected. Again, probably pretty close to the post-war norm.

Now, the growth rate will almost certainly abate from its heady spring/summer pace. It's probably abating some this quarter, and it probably will become a bit bumpy as well. We probably will not have a completely smooth progression through 1984.

Jerry Ford learned back in '76 that second year's of recovery aren't completely smooth, to his great dismay, or at least if he wanted to be President for second term. So, one can't guarantee that it will be completely smooth, but on average it probably will remain above the secular trend with real GNP over the four quarters growing at an annual rate of about  $4\frac{1}{2}$  percent. And, that again would be pretty much a standard recovery against earlier expectations that it would not be a standard recovery.

Now, I can think of four reasons why it should continue at a pretty good clip myself, all of which suggest that there must be at least six.

First of all, at this stage of the business cycle, as usual, a fiscal policy is expansive. Some spoiled sports might even say it's a bit more than expansive, but it's expansive--no question about that.

Secondly, as usual, at this stage of the cycle, monetary policy is accomodative. Some might have said until recently, perhaps a bit more than accomodative. But, nowadays there probably aren't too many saying that either.

I have a good friend in the Treasury Department, another high official. I had dinner with him a while back and I noted that the Central Bank head of Argentina had been jailed, and I asked any such plans for Paul Volker. And, he said "Not at all; everything is going well." So, once we can turn to the Federal Reserves as poor.

Thirdly, after almost four years of stagnation there's a large backlog of unsatisfied demands in the country. Now, I may be generalizing from the particular there too much. I was here 2½ years, Dawson, and I built up a lot of unmet demands over that period.

And, I assume that the public in this sort of a state of stagnation must have built up quite a few itself; for houses, for the things you put inside houses, for new cars to park beside garages--never inside, at least if you have children my age that are somewhat near houses and for new capital goods produce these and other items more efficiently.

And, I can't believe that all this pent-up demand has been dissipated in a mere 11 months. I believe there's still some out there.

And, finally, thanks to the second wave of liquidation in late '82, early '83, business inventories are low, low, low. And, thanks to the fact that this liquidation was occurring at the same time and indeed was made possible by the fact that a final demand was rising quite smartly through this period, stock sales ratios are even lower.

They are in fact the lowest since the third quarter of 1966. So, all in all then, it seems to me there's valid reason for believing that we have plenty of fuel for a solid business advance for a second year. It would be quite a shock if we weren't able to produce that.

And, just for a bonus, just to toss it in, this same good news really applies to inflation. We have too many idle laborers still in this country, too many idle machines and too many lags built into the decisionmaking process for us to have inflation breakout anytime in 1984. By that, I mean anything significantly above 5 percent as measured by the Commerce Department's real GNP deflator.

Now, 5 percent, of course, is not exactly a cheerful number by historic precedent. After all, a five percent inflation rate, you get a doubling of the price index in just 15 years, but certainly it's far, far below what I like to call its Carterian peaks.

So, again, sort of just to pick a number at random, inflation should remain under control through November 6th, 1984.

All of which brings me to precise point number three, and this is a less cheerful one. Incidentally, the short term outlook is rather boring. As you know, it's one of those times where even I can forecast it.

So, I'm going to stretch a little farther now because if you want to get some excitement, you really have to go a bit farther. And, this brings me to a less cheerful point.

Not only is fiscal policy stimulative at present, but of course, if left on its present course, it will become more stimulative as the recovery proceeds. And, that is something, a phenomenon, that is quite the contrary to normal post-war experience. Indeed, normal peacetime experience.

And, what's more, by now it's perfectly clear that there is virtually no chance whatsoever of rectifying this situation until deep into 1985 at the earliest with the affects not being felt until 1986, at the earliest/ And, I would emphasize "at the earliest."

Quite simply, the budget is like a car careening down the highway as the driver sits frozen at the wheel, and Washington the only place they say now where sound

travels faster than light, is now hearing or trying to position itself to hear the sound of voters displaying their preferences and it is not going to do anything about this problem, certainly, until after the election.

And, the job is so big that it really is optimistic in my view to assume that Washington will do much about it until well after the election. We aren't suddenly going to solve all our budgetary problems, make all our decisions that we won't even face up to today immediately after the election is over. It will be a long, time-consuming process before that issue is resolved.

Now, that means that in consequence the high employment deficit--any you know that one; that's the one that's associated with the memory of that late, British economist whose name started with "K", sufficiently associated that we now call it the structural deficit. That will at an absolute minimum widen by at least \$40 billion over the next two calendar years.

I'm not talking about the actual deficit. I am talking about the high employment deficit.

And, this of course, is precisely the opposite of what should be happening. And, of course, it's the high employment deficit that is the crucial measure of fiscal stimulus, not the actual deficit.

Now, people tend to think these days of possible dampening indirect interest rate effects of high deficits. You know, they go around worrying about these, and they tend to ignore the stimulus of the direct income effects.

Well, Keynes may be dead, but he's not that dead--not even where I come from in Chicago. And, so the budget is stimulative and it will remain stimulative and become increasingly stimulative as we push ahead.

Which brings me to precise point number four, and I hope by now you're getting a feel for how well organized this talk is. That's for the benefit of all of those of you out there taking notes--all three of you around here.

This one is that while by no means completely paralyzed, monetary policy could well become at least partly paralyzed over much of this same period. The old devil in this case is really a familiar one: a reluctance to permit the rising interest rates that are the normal accompaniment of a normal recovery.

And, this reluctance really is well founded, or it may be well founded. On economic grounds there has to be concern over the problems of the international debtors, the Mexicos, the Argentinas, the Brazils and now the Philippines of this world. After all, every increase in interest rates just adds to their agony, and this is a problem that is with us and will remain with us for



years ahead, and no responsible official can ignore it.

And, then of course, there are non-economic grounds as well. And, on these there really has to be concern over the political repercussion of rising interest rates. No real world official can ignore it, not at least if he wants to remain a real world official very long.

So, just think, if some people in this town already have been warning about all that might befall us if we have higher interest rates. Ask yourselves what they and others will be saying six months, nine months and twelve months from now about interest rates and what they should be doing.

And, of course, it isn't going to end then either. There's not going to be any magic bell that rings on November 7th, 1984, that says politics is dead folks. We no longer have to worry about interest rates and we can let them go as they would. There will be many people who will be pointing out that the next Congressional election is a mere 700 and some-odd days away.

So, quite simply then, the prospect is high that monetary policy is going to be under constant pressure to follow what would in effect be a too little-too late course throughout the long, political campaign and indeed even afterward.

And, let's just remember as fiscal policy will be-coming even more stimulative than it is today.

Now, every effort is going to be made to resist such pressure by the Federal Reserve, without question. But the point I'm trying to make is, it will be there We will be living in that sort of an ambience, as we like to say, for a long period ahead. And, this always gives us the possibility of trouble in this area as well, and if not sooner, then later.

But, when you have large budget deficits you are inevitably, sooner or later, going to have interest rate pressures and you are going to have people say these interest rate pressures should be avoided.

Okay. Precise point number five: there's a considerable danger, therefore, that despite all our protestations at this time around it wouldn't happen again, but it may. In other words, we could be back into a situation where we once again are about to lay the groundwork for a unsustainable boom.

Yes, that's the danger. Not this danger that we hear that the recovery is going to be quickly aborted. That isn't the danger. We aren't going to abort this recovery. The danger is that we're going to let it get out of hand.

The combination of an economy that wants to grow,



a fiscal policy that has both hands tied behind its back, and a monetary policy that will be constantly pressured to put at least one hand behind its back can only spell trouble.

And, one thing we've learned, if the business expansion does get out of hand, economy does begin to take a dynamic life of its own where it says to hell with interest rates, we can push ahead, and I've heard that again and again from businessmen: what's an extra one percent; what's an extra two percent? Their hurdle rate is always 10 percent, as points higher when there's a boom.

If that's what develops, in the end there will be no chance but for the Federal Reserve--no choice for it but to give us a policy of too much, too late. Now, remember I started late, so don't -- take that out of the next speaker's time.

It would have no other choice then to use a monetary pile driver, and even if it didn't want to, the markets would pressure it too.

Okay. I'm beginning to note here, and partly it's the way the thing is laid out, but I do tend to have a tendency to constantly look over to these people at the right rather than you people at the left. Forgive me; that's the sort of the hangover of 2½ years of the

Reagan administration. I have a little--you know, that just comes with the territory.

Well, precise point number six, if we do indeed blow the opportunity for a long, sustained expansion by letting it get out of hand over the next two years, the chance of a political reaction thereafter are high.

We have really -- we are now in a situation where we have the potential for one of the great, non-inflationary post-war growth periods. That's what we really have before us if we have the proper policies.

But, if we don't achieve this potential, if we don't have the proper policies, there will and I fear there should be, a political backfire. And, the result almost certainly will be a move toward greater government intervention in the marketplace.

Now, as I heard the Secretary, he was saying that what he wanted to see is the opposite, and certainly don't we all, and including the agri-business sector. But, until--if we have this situation arise, it will be very difficult to us.

And, not until you are in government or at least close to the farm sector as you people are, can you fully appreciate the incredible range of its rules and regulations and powers. And, despite its hopes and intentions to the contrary, the Reagan Administration has been able to

accomplish very little toward reversing these powers and reducing the role of government.

Other than interest rates and buses--that's right, buses--progress has been painfully slow. And, all we've been really able to do over these last several years is to prevent an increase in Washington's role. But, if a political reaction occurs, there are large numbers of people out there ready to fill that, to them, unpleasant vacuum and move Washington ahead to new interventionous heights.

And, that will of course occur under the name, or more likely since the name is beginning to get a bad name, in the form of industrial policy, which stripped of its rhetoric means at least to those currently espousing it government actions to effect the course of specific industries.

And, I always get myself amused by that because specific industries--I never saw one that wasn't made up of specific companies. That's what we're really talking about, and somehow people always ignore that. And, if there's two things you learn in Washington, they are first, that government is hardly a superior judge as to who should be the favorite sons, and secondly, even if it were, politics would prevail in any event.

So, I say that the fate of the current business

expansion is going to not only have macroeconomic implications, but it's going to have significant microeconomic implications. And, of course, that in turn means that they will have macro-implications of their own, which brings me to my last and final point and obvious one--economists are a strange breed.

Now, even when it stopped raining and the sun has burst forth and certainly that is the case today. If you look outside there economists can find a cloud on the horizon so they can start worrying about a storm ahead.

We are professional worry mongers. Now, you and I know though that this madness is not completely without merit. After all, who needs an economist on the payroll if the world ahead is going to be serene, if we can't convince people that there might be clouds ahead, clouds of course that only we can see, and even maybe hope to dispel. What would be the point of hiring us, or rehiring us.

And, incidentally, you need not answer that. That's it. Dawson is getting uneasy which suggests my time is up, which really is too bad because I had the feeling that this talk was just about to start getting good.

But, unfortunately, I'm afraid we won't have a chance to ever learn, Dawson.

Henry C. Wallich, Governor  
Federal Reserve System

A transcription of remarks made Monday, October 31, 1983  
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Bob Dederick has really said a great many things that I would have liked to have said and no doubt I shall, so I'm afraid you'll have to sit through some of the same things twice.

On the other hand, that shows you that economists sometimes agree. That is an interesting phenomenon in itself.

Now, the title of my topic is "International Monetary Policy". I think I ought to interpret this to mean the International repercussions of U.S. monetary policy because unfortunately--or fortunately--so far the world has no unified international monetary policy. We just have the national monetary policies of many countries.

But, among these many countries, the U.S. is the only one that is big enough and influential enough to have to consider the feedback upon itself of its own actions. That is to say when the U.S. does something in the international arena, it has enough of an effect on

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the fate of the rest of the world so that feeds back upon ourselves.

We, therefore, in our own self interest, not just from other reason, have to take into account the effect of our actions on other countries in a way that smaller countries do not have to do.

Some people refer to this as a locomotive character. I don't like that term. Some people refer to it as the elephant in bed and I think that's perhaps more nearly descriptive of what we're doing right now.

There is a very well intentioned beast, but every time it moves and turns over the bed shakes and somebody falls out.

We hear a great many complaints abroad about the consequences of American policies, and I don't think I surprise you very much by saying this. The list of complaints goes on and on and they are in good part legitimate concerns which we need to waive precisely because their consequences come home to us.

One concern, of course, is that the U.S. has high real interest rates and this drives up interest rates abroad. And, high interest rates slow down their recovery which is much less advanced than ours.

A second complaint is that the dollar is high. That raises the price of the imports abroad and it may add to inflation abroad; that adds to unhappiness.



The combined effect of a high dollar and high interest rates create problems for the developing countries which are struggling to meet their debt obligations they earn very often in non dollar currencies. They then have to convert that to meet the debt service which is predominantly in dollars into our currency, and so both the exchange rate may work against them and the interest rate which on most of the LDC debt is a floating rate works against them.

And, once more, there are complaints about the United States. There is the further concern that a high dollar will lead to protectionism in the United States.

And, finally, the concern that a high interest rate in the United States attracts capital from abroad. That means we drain the world of the scarcest resource there is: Investable capital. And, we use it to finance our deficit, the deficit of a very rich country that ought to be able, if it has to have a deficit at all, had to finance it from its own resources.

Well, in making this list of particulars, sometimes one gets the impression that the United States is abroad, plays the role somewhat that the Federal Reserve plays at home when you don't know what else to do or say, blame the "Fed", that's the U.S. practice. And abroad, if you don't know what to do or what to say, blame the United States.

Nevertheless, we do have to give these concerns a fair hearing because, as I say, they come back to us in the form of economic consequences on the rest of the world. The United States is a much more open economy than it used to be. We cannot live prosperously in a world that is not prosperous. We have to take their concerns into account.

Now, in evaluating these concerns I think one approach is to note that our friends don't give us full credit for what good we do, and we do some good. The dollar is high by some standards, and I have a word to say about that later.

Well, one effect of that is to increase our imports, so we're helping the rest of the world by buying more from them, which is much needed at this time.

We have a large budget deficit which raises interest rates, to be sure. But, it has also given us a very good recovery and has launched us into a strong expansion now. As a result, once more our imports are higher than they would otherwise have been.

There is also a price effect. Developing countries that export primary products find that the prices of these products rise in response to the American cyclical impact, and they benefit in that regard.

Our exports have declined partly as a result of the high dollar, partly because business abroad is still weak. Now, insofar as this is viewed to the high dollar, it leaves more room to the rest of the world to compete.



Much as I regret it, but we seem to be surrendering some of our export markets to foreigners who are advantaged by their lower currency. We are also allowing foreigners better access to our domestic markets.

This creates a great deal of difficulty at home when industries are impacted by competition from countries with low exchange rates, but at least we ought to get credit for this effect. It is something of our own making and of our country's, in that sense, benefit from the level of the dollar.

I think the world benefits also from the fact that the United States has reduced its rate of inflation. Some countries may be able to live with high inflation. The United States clearly cannot, and we have so far done a very creditable job, I think, in bringing the inflation down.

That adds to stability all over the world and is part of a contribution that we have made.

Now, if you look very carefully at these foreign complaints that I began by listing, they all somehow relate to conditions impacted in the U.S. by a budget deficit and by monetary policy. My topic here is international monetary policy, but the fact is that our monetary policy is very severely constrained by the budget deficit.

Most of the things that happen in the financial area today are the consequences of a very large budget deficit. And, so we need to look at this deficit a little more. If Bob Dederick did this before I came in, I hope you'll forgive me. Maybe we can work up a little difference on this score.

This is a country in which saving is a very scarce commodity, and when the government absorbs a large part of the nation's saving, it is making a serious drain. We're not like Japan which is a very high-saving country. If the government does run a large budget deficit that does not reduce the supply of available funds very much.

Very different in our country -- we have a net private savings of the order of 6 percent GNP and the deficit is about of that same order. So at the present time practically all our net savings--that is saving after depreciation allowances--is absorbed by the deficit.

Now, there is some saving left over for the rest of us other than the government, and that is because gross savings before depreciation allowances are of course larger gross savings are -- that is private or non-federal gross savings are of the order of 18 percent of GNP.

So, the deficit is one-third of that, but that

doesn't help us a great deal because the depreciation allowances which are the larger part of gross saving are needed to replace capital that is wearing out. We need to continue maintaining and if possible increasing our capital stock. And, the means for that are very limited under this large budget deficit.

Now, you might say some of the deficit is not real structural; it's the result of the state of the business cycle. At the present time, that is perhaps one-half of the deficit.

The unfortunate thing is that our expenditures, the entitlements particularly, and our revenues are so set that as the cyclical part of the deficit diminishes and goes to zero as we reach high capacity operation, the structural part increases and tends to remain somewhere in the neighborhood of 6 percent of GNP unless we do something about it.

So, there is an urgent need to deal with the budget deficit. As far as the Federal Reserve is concerned this means that the Federal Reserve is under constant pressure to avoid monetization of the deficit.

As Bob Dederick said, when you run a very large budget deficit, there is a great deal of pressure to monetize and a great deal of effort is needed to avoid monetization. But, if you don't monetize a large budget

deficit, you will have higher interest rates. If you do monetize a large budget deficit then you will have higher interest rates too, only a little later and much, much higher as the inflation takes over, that as inflation expectations even earlier tell people which way the wind is blowing.

The Federal Reserve has very limited power over interest rates in this situation and all it can do is try to follow a money supply target and try to continue to bring the inflation farther down.

Well, looking further at some of the complaints of some of our friends abroad, it is true that our interests are high than they tend to be transmitted to other countries. Capital markets are very integrated nowadays.

Nevertheless, they have a chance on the system of floating exchange rates to uncouple and to some extent they have done that. That means they have allowed their exchange rate to depreciate at some pain to them, but that has enabled them to conduct a policy of lower interest rates and again that has happened.

Therefore, one cannot say that other countries are simply exposed to the impact of high American interest rates. They can within limits conduct their own monetary policy.

We have seen the complaint that the dollar is high and is doing damage to other countries. While it is true it raises the price of imports, but not everything that it invoiced in dollars is produced in the United States. And, it is only U.S. prices that go up for the rest of the world when the dollar goes up.

If the prices from the third country happen to be invoiced in dollars, all that happens is when the dollar goes up their invoice prices go down because they're based on local costs.

Now, for most countries that part of their imports coming from the United States is not all that large and therefore the cost impact and the inflationary impact about which we hear so much is really much more limited than they would like to agree.

The high dollar has other problems for our friends. For instance, the variability of exchange rates. You hear a good deal of concern about the variability of rates. Well, it is true that under the floating system exchange rates have become much more variable than one would have thought.

On the other hand, the alternatives to the floating exchange system are very, very implausible. There are people who think we could go back to a fixed rate system or to a gold standard. That's not in the cards.



You have very widely varying rates of inflation around the world and currencies cannot be completely stable under those conditions.

The best way to reduce the variability of currencies is to conduct a stabilizing domestic monetary policy aiming at a greater price stability. If all countries move toward price stability, then indeed, I think, exchange rates will cease to swing as widely as they have done and they will present less of a problem through these fluctuations.

That gets me to the outlook for the dollar. The dollar today it is said abroad is strong because U.S. interest rates are high. There's some truth to that but there's a lot more to be said about the dollar.

The dollar is strong because this is a highly productive country where it is attractive to put your money and so money is coming here. The dollar is strong because we brought inflation down. There's still inflation in many countries abroad higher than ours.

The dollar is strong because we've got a stable political system. That, too, is more than many countries can say of themselves. The United States has become a sort of a safe haven and money flows here in very large amounts.

Now, of course this flow of money to the United

States is troublesome in itself because it deprives the rest of the world of capital that is badly needed. It's perhaps not as badly needed at the present time when economic activity is low and there's really no close limit on the supply of saving that could be generated through an expansion of income.

But, as we move toward fuller use of capacity there'll be more of a constraint on the world supply of saving. The United States attracts a large part of that. There will be less left for others, and this, I submit, is a very unfortunate situation.

Here's the richest country in the world borrowing from other countries in order to finance its budget deficit. I think that is a situation that is rightly criticized.

Well, I suppose you won't be surprised if I arrive at a conclusion that's obvious: the key to this whole problem to meeting the concerns of our friends abroad and to straightening out our own affairs is not really a monetary policy. Monetary policy has to continue doing what it's doing: keep the aggregates on track and continue to bring the inflation down.

The key is fiscal policy--the budget deficit. And, everybody knows what needs to be done. Nobody knows how to do it. We do not have to close the budget deficit

instantaneously. In fact, if we did that somehow reduce a \$200 billion gap, that will probably be deflationary. But, what we need to do is to eliminate the structural element.

Then as the economy moves toward full employment, the cyclical element will disappear, too, and the whole deficit will have disappeared or at least would have sharply shrunk.

This is, I think, the direction in which we have to go. I am not a politician. I sympathize with people who are asked to do this in an election year or before an election year. Perhaps there are ways in which they would at least prepare the way for 1985 to be a year of quick action on this front and not a new starting up of the debate beginning from scratch.

Monetary policy meanwhile can contribute in great deal to keeping the expansion on track. It can do that mostly, however, by avoiding -- trying to fine tune and trying to interfere with the gradual, stable evolution of the economy in an effort to push the economy too hard has always been counterproductive.

At this point of a business cycle, historically there's been a great temptation to push too hard on monetary policy. I hope that we have avoided that so far.

Today the consequences of excessive expansionism would come much more quickly than they would have come in the cycles of the past because people today know the game. You no longer can fool some of the people some of the time. You can't fool anybody any part of the time, and as soon as people observe inflation reaction, they act to protect themselves by asking for higher pay, charging higher prices and the fat is in the fire.

So, steady as she goes is the guideline for monetary policy, and the immediate action is on the side of the people that handle the budget.

Thank you very much.

James R. Donald, Chairman  
World Agricultural Outlook Board, USDA

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## U.S. AGRICULTURAL OUTLOOK

Agriculture is undergoing very severe adjustments in production and markets. Next year promises to be one of further adjustment, but we should see a more even distribution of improved conditions in agriculture.

This year the farm sector was hard hit by a severe drought. Low yields, combined with U.S. acreage reduction programs, are sharply reducing surplus global crop supplies.

The impact of reduced production on the farm sector is very uneven. U.S. crop farmers participating in acreage reduction programs and achieving good yields are doing well. But others are facing severe financial losses because of the drought. Farmers in many other countries have had weather favorable to large harvests and are receiving prices above last year.

Livestock producers are suffering low returns brought on by large meat supplies that have depressed prices in the face of rising feed costs.

In 1984, a continued recovery in the global economy will stimulate demand for agricultural products without unduly increasing costs. Global commodity supplies still are large, but sharply lower U.S. production will bring supplies into much better balance with demand.

For farmers, the coming year promises to be one of greater market returns. We should see increased crop production and marketings and higher prices for both crop and livestock products. Increases also are in prospect for production expenses, if 1984 crop acreage expands and input use and prices respond as expected. On balance, after accounting for the likely expansion in 1984 crop output and the expected higher value of inventories, 1984 net farm income could exceed the \$24-26 level billion expected for 1983, while net cash income could lag. Income in 1982 was at a reduced level of about \$22 billion.

For consumers, the new year is likely to be one of continued adequate food and fiber supplies, but at moderately higher prices than in 1983 because of improved supply and demand balances. Stronger demand that will accompany the economic growth, along with increased marketing costs and

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higher farm prices, suggests a food price increase in the 4-7 percent range. This follows an increase of only 2-3 percent expected for 1983, which is being held down by a drop of 4-5 percent in prices of food commodities.

Any look at the agricultural outlook for 1984 must recognize underlying concerns about the future economic vitality of agriculture. These concerns remain on both the supply and demand side, despite improved conditions brought about by record U.S. crop acreage reduction and last summer's drought.

The 1980's have seen slowed growth in global demand for agricultural products. Depressed world-wide economic conditions and financial constraints have cut into demand. While some improvement is expected in 1984, economic recovery is likely to be slow and some countries will continue to have debt problems. So, next year is likely to be one of modest expansion in demand for agricultural products.

This sluggish demand of the early 1980's contrasts with sharply increased output and production capacity, built up in the 1970's in response to rapidly growing demand. It is likely that with normal production conditions, agriculture's capacity to produce at recent price levels will continue to outpace demand over the next several years. The implications of this imbalance are of concern to farmers and policymakers alike.

Compounding the problem from the U.S. standpoint is the loss of export market shares in the early 1980's, reflecting increased competition from other exporting countries and actions by some countries to limit imports, as well as the strong U.S. dollar. U.S. market losses, along with good growing conditions in 1981 and 1982, led to a reduced level of farm income, although Government expenditures for price support programs rose rapidly.

The challenge for agricultural leaders in the 1980's is to provide an environment for moving agriculture to greater prosperity--an environment where producers around the world can better respond to signals from well-functioning and growing markets.

#### U.S. COMMODITY SITUATION AND OUTLOOK

The current U.S. crop situation is one of large stocks, sharply reduced production, and much higher prices for corn, soybeans and cotton, and some improvement in demand. Meat output is at record levels because of a sharp expansion in pork production, but livestock feed-price relationships are now unfavorable to hog and cattle producers. Despite depressed livestock prices, the overall level of farm prices in mid-September was slightly above a year ago, after being down over 4 percent in July, prior to effects of the drought. Price levels for both corn and soybeans were more than 50 percent above September 1982.

Demand appears to be improving but has been hurt by sluggishness in worldwide economic performance and financial constraints in some countries. U.S. exports have been further dampened by increased competition from other producing countries and a relatively strong U.S. dollar.

Domestic demand gains have been moderated by a lagging U.S. economy, although the recent pickup in activity and expanded livestock requirements have helped demand. Both the volume and the price of U.S. exports dropped in fiscal 1983. The value of around \$34-1/2 billion was \$4-1/2 billion below 1983 and nearly \$10 billion below the 1981 record.

The value of U.S. exports was down for most commodities. Exports to Western Europe, the Soviet Union and China showed declines amounting to around \$5 billion in fiscal 1983. In addition to economic factors, the drop also reflected political considerations, particularly for China.

The outlook for 1983/84 is for smaller global supplies because of the sharply reduced U.S. crop and some pickup in demand for most crops. Crop prices will benefit from tightening supplies relative to use, while livestock prices should be supported by improved global economic conditions and lower production by the second half of 1984. Higher commodity prices should mean a substantial increase in the value of U.S. agricultural exports in fiscal 1984.

### Crop Supplies

Large carryin stocks and increased foreign production will add to crop supplies in 1983/84. Global grain supplies are down only 3 percent, even though U.S. production is down 38 percent. World cotton supplies are down only 1 percent despite a drop of 38 percent in the U.S. crop. Global grain production in 1983/84 will decline from last year, due mostly to drought-reduced U.S. coarse grain prospects. World wheat production, may surpass last year's record level, even with a smaller U.S. crop. Hot, dry weather also has damaged crops in Canada and Western Europe. But good weather in Australia, China and India has improved prospective outturns there, and the Soviet grain crop appears to be the best since 1978. So, world wheat supplies will exceed last year's burdensome level. Hot, dry weather stressed many U.S. crops at crucial growing stages and, coupled with acreage reduction programs, reduced U.S. feed grain production by more than two-fifths.

World soybean production in 1983/84 is forecast down nearly 20 percent from last year's record, with the U.S. crop down around one-third. Global supplies are down about one-tenth, and higher prices are expected to encourage larger plantings in South America.

A substantially lower U.S. cotton crop is being nearly offset by larger foreign production--1983/84 world output will be down less than one million bales--and total supplies will be down only 1 percent. Prospects are for a much larger crop in the Soviet Union and for a further increase in Chinese production, while the Brazilian crop is down slightly from last year.

## Consumption

World commodity consumption in the 1980's has been hurt by depressed economic conditions. Foreign consumption in 1983/84, except for soybeans, is expected to rise modestly from current depressed levels, but not much stimulus is likely to U.S. export volumes.

Total foreign grain consumption is expected to be up about 2 percent, with feed grains accounting for most of the increase. Much of the increase in feed grain use is in the Soviet Union, where livestock inventories are at record levels.

Tighter supplies and higher prices will hurt the competitive position of soybean meal, and foreign soybean consumption may be down slightly from the 1982/83 level. Cotton should benefit from continued large supplies abroad and the improvement in economic activity. Foreign use in 1983/84 is projected over 2 percent larger.

U.S. crop consumption is expected to be supported by further gains in the economy. Total use of feedstuffs will decline, although large supplies of wheat will mean greater feed use.

## Stocks

Even with slow expansion or declines in crop consumption, global production levels for feed grains and soybeans will be well below use. The cotton crop will be moderately short of use, while the wheat crop again will exceed anticipated use.

Most of the 1983/84 global stock reduction will be in the United States. Total U.S. grain carryover stocks will be cut in half, from about 140 million tons. Feed grain stocks may be cut to one-third of beginning stocks. Still, projected feed grain stocks represent about 13 percent of estimated 1983/84 use, above around 10 percent in the mid-1970's. The stocks/use ratio for corn of 9 percent compares with about 7 percent in 1973/74, 1974/75 and 1975/76.

The very sharp reduction in U.S. soybean stocks will leave the stocks/use ratio at around 7 percent, about the same level as the lowest recorded in 1976/77. Even with the prospective sharp reduction, U.S. cotton stocks are projected to represent nearly 40 percent of annual use.

Demand for stocks in foreign countries can be affected both by large supplies and relatively low prices or by tightening supplies and rising prices. In the former case, a significant buildup is projected for Soviet wheat stocks. In the latter case, early and heavy sales of corn and soybeans have been recorded to Japan.

## Trade

Following rapid expansion in the 1970's, world trade has dropped in the 1980's. Trade has suffered from global recession and high unemployment, debt burdens in Third World food importers, and from good weather and government policies which have reduced import needs in some countries. Even with improving economies abroad and a relatively high level of meat production, global trade prospects are not bright for 1983/84.

The volume of U.S. exports will be hampered further by tightening U.S. commodity supplies and continued strength of the dollar. However, higher commodity prices should mean an increase in the value of U.S. exports from 1982/83's depressed level. The new 5-year agreement with the Soviet Union and the settlement of the textile dispute with China also should mean greater exports to those countries.

Total U.S. grain export volume should remain near the 1982/83 level, as the increase for feed grains offsets most of the decline for wheat. Cotton exports may increase slightly, but a sharp drop is likely in U.S. soybean exports, mainly reflecting a decline in the prospective crush in importing countries such as the USSR, Eastern Europe and the European Community.

The value of U.S. animal product exports dropped around one-tenth in 1982/83, dampened by poultry product subsidy policies of other countries and higher U.S. pork prices much of the year. Large meat supplies in much of 1983/84 could slightly stimulate export movement.

The value of U.S. agricultural imports may continue to be supported in 1983/84 by the U.S. economic recovery and higher domestic prices. Global sugar prices should benefit from a closer balance between production and use in 1983/84.

## Prices

Even with record or near-record crop supplies on hand, the combination of a one-fourth reduction in PIK-crop acreage and hot, dry summer weather has led to sharp increases in prices for most feed grains, soybeans and cotton. In mid-September, the farm price of corn was up more than 50 percent from a year ago; soybeans were up more than 60 percent, while cotton prices were up about 15 percent.

Season-average crop prices in 1983/84 will be sharply higher for corn and soybeans, while wheat prices are likely to remain near the loan level. Cattle and hog prices are under pressure from record meat supplies, while feed costs are rising. Livestock and poultry product prices in 1984 should benefit from reduced pork and beef supplies, particularly in the second half. Continued improvement in the economy also would support prices.



## U.S. FARM INCOME

Net farm income is expected to increase in 1983 to \$24-\$26 billion from the reduced 1982 level, due to reduced production costs and larger Government payments. The drought is having a mixed effect on farm income in 1983. Smaller crop production has helped crop prices, while increased livestock slaughter has hurt prices, but provided the base for a faster recovery in livestock prices. The reduction in the inventory value will be greater with the drought because of much smaller production and stocks. The 1984 outlook is for gains in marketing receipts and increases in crop inventories, while production expenses will be higher and Government payments lower.

### Farm Prices

The overall level of farm prices in 1983 is likely to increase slightly, reflecting declining crop prospects and supplies. Increased meat supplies in the second half will mean lower average prices. Prices for both crops and animal products should average considerably higher in 1984, as supplies tighten and demand improves.

### Cash Marketing Receipts

The one-fourth drop in crop output and lower livestock prices will cut marketing receipts 1 or 2 percent in 1983. Larger crop output and higher prices for both crops and livestock products should push up total cash receipts in 1984.

### Farm Production Expenses

Production expenses are expected to decline 3 percent in 1983--only the third time expenses have declined since 1940. Only a modest increase of around 1 percent is expected in farm prices paid for inputs, while overall input use may decline around 5 percent. Prices paid for fertilizer, fuels and energy will average below 1982 levels. Input use is down with the 20-percent cut in acreage planted to major crops.

Production expenses are likely to rise substantially in 1984, responding to increased crop acreage and expanded demand for inputs.

### Net Farm Income

Farm income dropped to around \$22 billion in 1982, one-fourth below 1981. Despite a decline in 1983 in marketing receipts, net farm income (after adjustment for inventory change) should be up 10-15 percent. Production expenses are down, while Government payments are up sharply due to the large volume and value of PIK crops.



Farm income in 1984 could exceed 1983 based on increased farm prices and larger crop marketings. Also, the value of crop inventories is likely to increase next year, if crop production expands as expected from the reduced 1983 level. Net cash income could lag the increased 1983 level.

## FOOD PRICES

Current food price forecasts for 1984 are tentative at best. But it does seem likely that the food price increase will be above this year's exceptionally small advance. Costs of processing and distributing food will continue to rise in 1984, although at a modest pace relative to a few years ago. Labor, which represents the largest element in food processing and distribution costs, will continue to exert a moderating influence on overall food marketing costs. Prospects for further economic growth enhance the likelihood of rising consumer incomes and larger per capita food expenditures.

Unlike the past few years of price-depressing commodity supplies, food supplies and demand in 1984 are expected to be in closer balance as a result of smaller planting of some crops, production adjustments in the livestock industry, and last summer's drought. Average farm prices of food commodities in 1984 are expected to rise moderately, following this year's decline of 4-5 percent which is mainly responsible for the very small rise in retail food prices in 1983.

Before the drought, the 1984 food price increase was expected to about double this year's low rate, responding to increases in marketing costs, slight higher farm prices, and the stronger demand accompanying economic recovery. Currently, a food price increase of 4-7 percent is projected for 1984, with about 1-1.5 percent of the increase attributable to the drought.

While the drought's impact on the yearly increase in food prices is relatively small, it will have a much greater impact on the pattern of prices during the year. Early in 1984, food prices will rise at a slower rate than forecast before the drought. This is because of an expected increase in meat animals sent to market in response to the drought and higher feed costs. But food prices, particularly meat, likely will rise in the summer and fall 1984 when the adjustment in livestock production reduces beef and pork supplies. Red meat prices in the third quarter of 1984 could be a tenth above prices expected this fall and early winter.

## U.S. FARM PROGRAMS

Government outlays for price support activities have risen from around \$4 billion in fiscal 1981 to around \$20 billion in 1983. Underlying causes of this rise relate to losses in export markets and good weather and large crops in 1981 and 1982. Farm program decisions and proposals for 1984 center around increasing the competitive position of U.S. commodities in world markets and reducing price support outlays.

## Commodity Programs

Provisions of the 1984 wheat program were announced on August 9. The loan rate has been reduced to \$3.30 per bushel, while the target price is up to \$4.45. The higher target price for 1984 should encourage program participation, although the lower loan rate, a reduced PIK payment rate and the higher acreage reduction percentage are likely to be more than offsetting. So, 1984 compliance is likely to be well below the high level of 75 percent in 1983.

Program provisions for feed grain crops include a reduction in the loan rate and an acreage reduction program. There will not be a PIK program for corn. Cotton and rice program provisions have or will reflect the need for less acreage reduction in 1984. Also, Congress is considering further changes in 1984 crop program provisions.

Dairy program costs have risen sharply in recent years, with expansion in output, weak demand and a buildup in surplus stocks. Current dairy program provisions for 1983/84 include a support level of \$13.10 per cwt. and a \$1.00 deduction from producer marketings. Congressional proposals to bring supplies into better balance with demand include a milk production reduction program that would compensate producers for reducing output from a base level.

## Export Programs

Losses in U.S. trade shares are of intense concern. These losses have led to depressed commodity prices, reduced farm income and rising Government costs. Proposed commodity loan rate reductions reflect concern that loan rate levels have kept market prices too high to bring about a better balance between production and market needs.

U.S. export market losses and other actions to maintain shares include: The increase in export assistance programs, such as the blended credit program, along with subsidized sales of wheat flour to Egypt; discussions with other exporters about using subsidies to expand market shares, such as the European Community; and negotiations with other countries to open their markets to U.S. exports, especially Japan.

## Beyond '84

Secretary of Agriculture Block already has begun a dialogue among agricultural leaders about future farm programs. Current legislation expires with 1985 crops.

Experience so far in the 1980's indicates that agricultural production capacity built up in the 1970's exceeds market requirements at recent price levels. An unusual combination of developments has magnified the imbalance problem: depressed economic conditions and financial problems led to weak demand; while good weather favored high yields and increased production in many countries. Also, the supply-use balance can shift sharply, as it did this year with the U.S. drought. Still, the outlook over the next year

appears to be one of slow recovery in economic conditions and modest growth in global agricultural markets, and the potential for faster expansion in acreage and production in response to higher price levels. This would suggest future build-ups in inventories and increased Government costs.

So, U.S. agricultural programs for 1985 and beyond will take into account:

1. International aspects, including the importance of export markets to U.S. farmers, slow growth in global demand in the 1980's, trends toward protectionism in some countries, and the impact of U.S. policies on competitors;
2. U.S. budget constraints and program costs; and
3. The inherent instability of supply, demand and costs.

We need ideas and invite your input into this program-development process. We all have a common objective--economic prosperity for agriculture in the years ahead.

## Prospects for 1983/84

### Supplies

- Global Crop Supplies Large
- U.S. Crop Supplies Tighten
- U.S. Livestock Output High

### Demand

- Stronger U.S. Economy Boosts Demand
- Foreign Recovery Lags U.S.

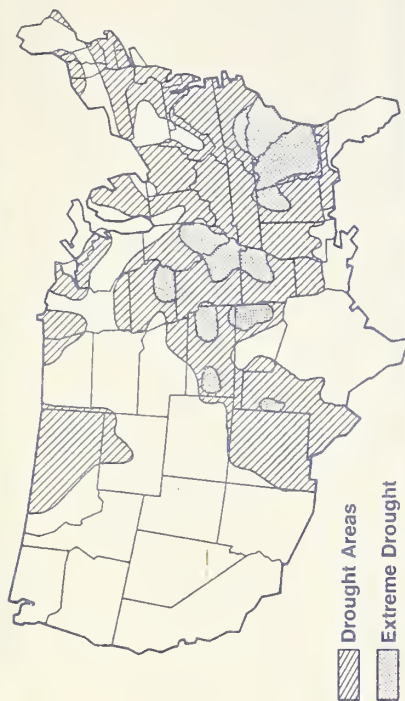
### Farm Outlook

- Higher Crop Prices
- Livestock Prices Under Pressure
- Farm Income Prospects Improving

### Farm Policy

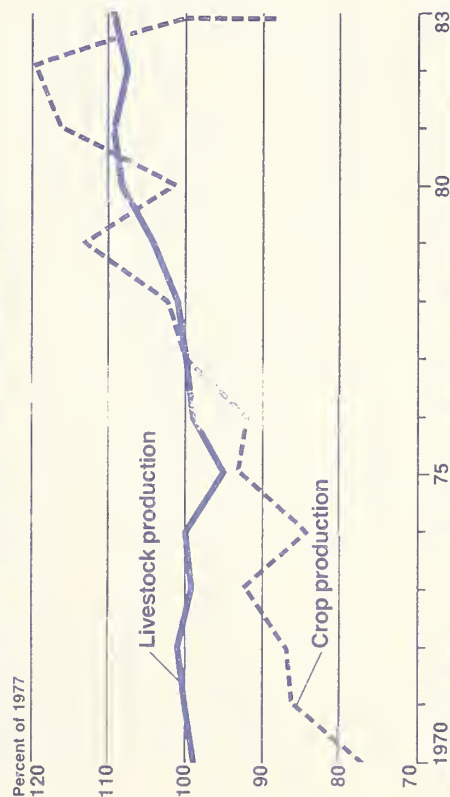
- Major Adjustments Needed

## States Affected by 1983 Drought

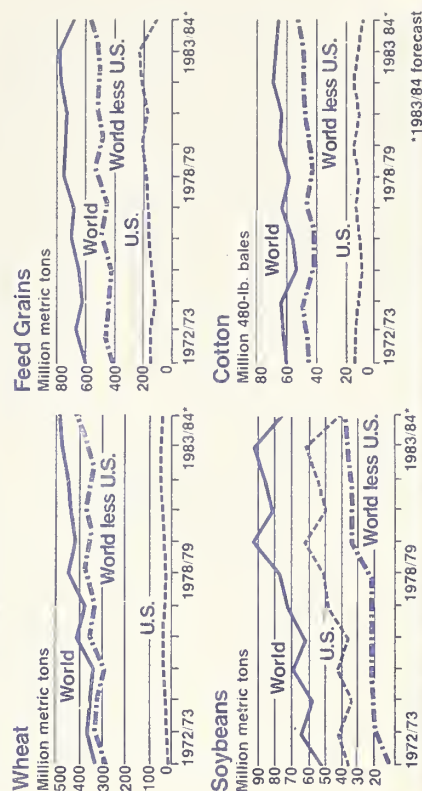


Based on CMI Through August 20, 1983

## U.S. Crop and Livestock Production

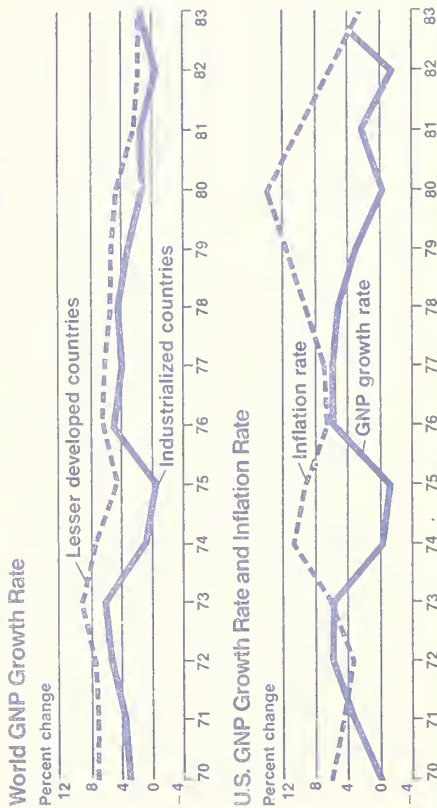


## World and U.S. Commodity Production, 1972/73-1983/84\*

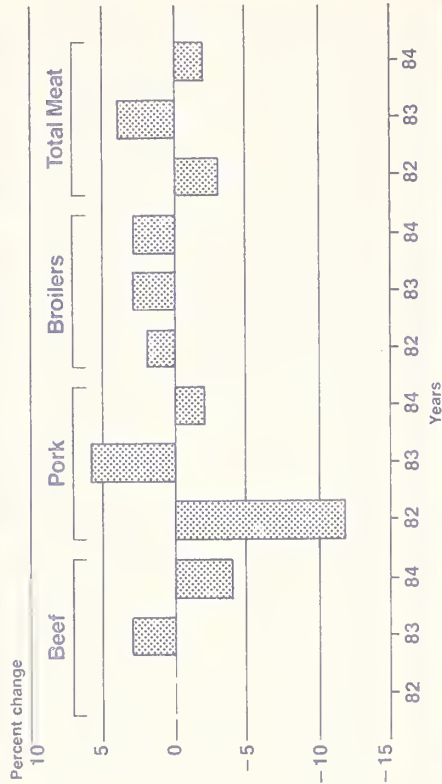




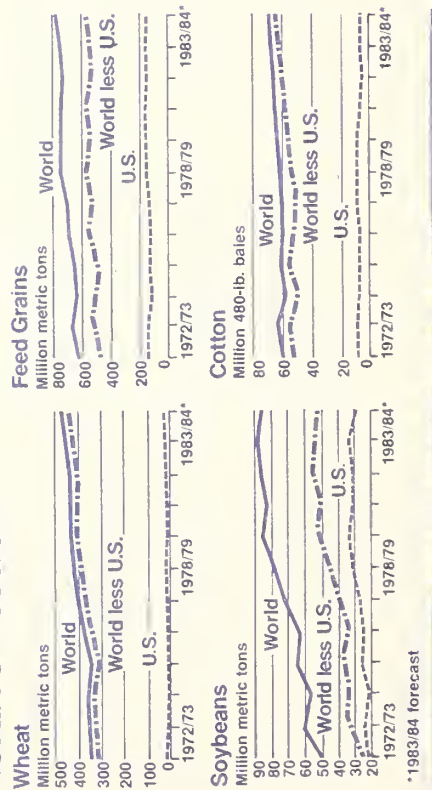
## World Economic Indicators, 1970-1983



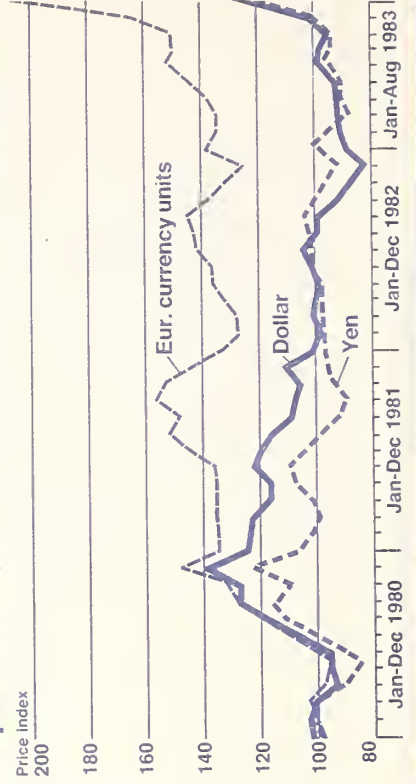
## Livestock Production Changes, 1982-1984



## World and U.S. Commodity Consumption, 1972/73-1983/84\*



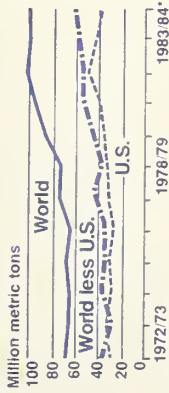
## Effect of Exchange Rate on U.S. Soybeans Export Price, Gulf Port, First Quarter 1980=100



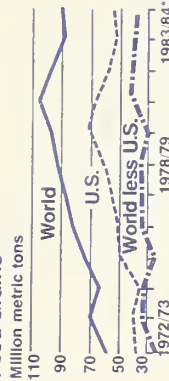


## World and U.S. Commodity Trade, 1972/73-1983/84\*

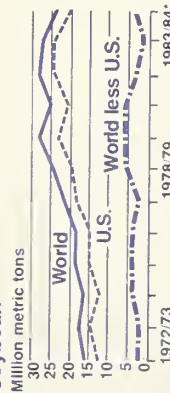
### Wheat



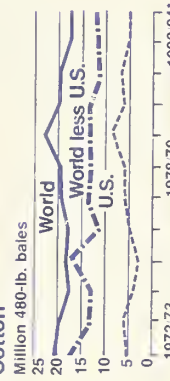
### Feed Grains



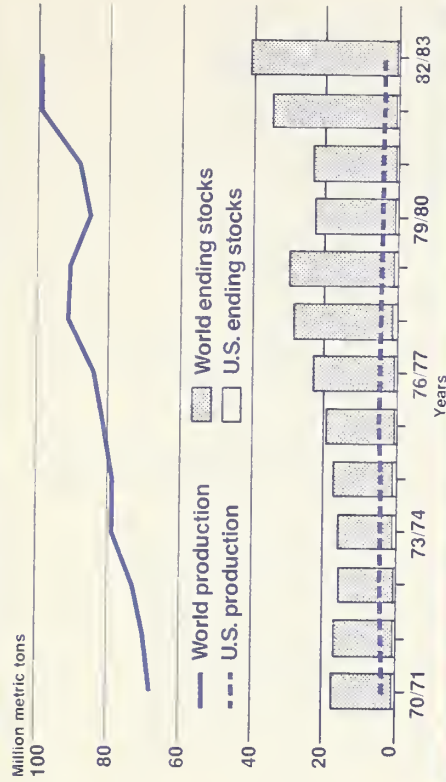
### Soybean



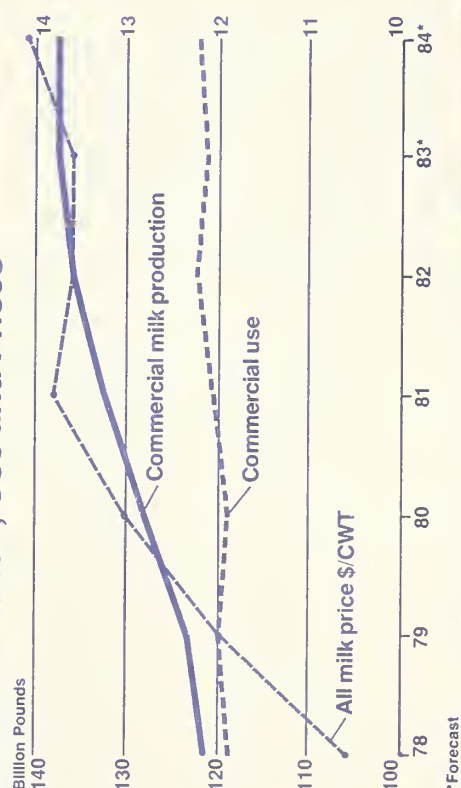
### Cotton



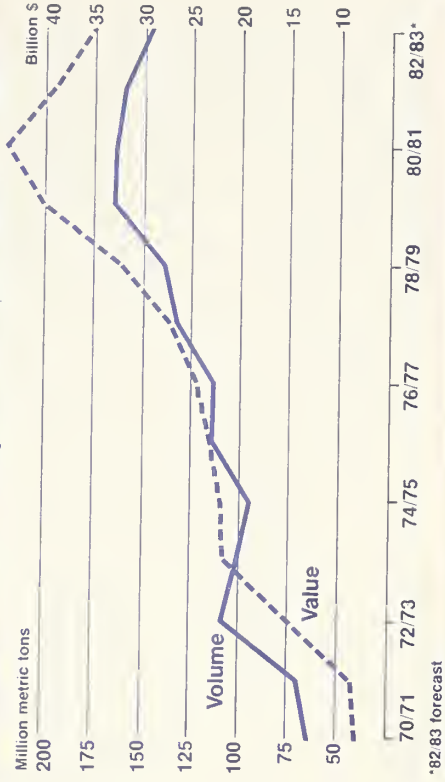
## Sugar Production and Stocks, 1970-1983



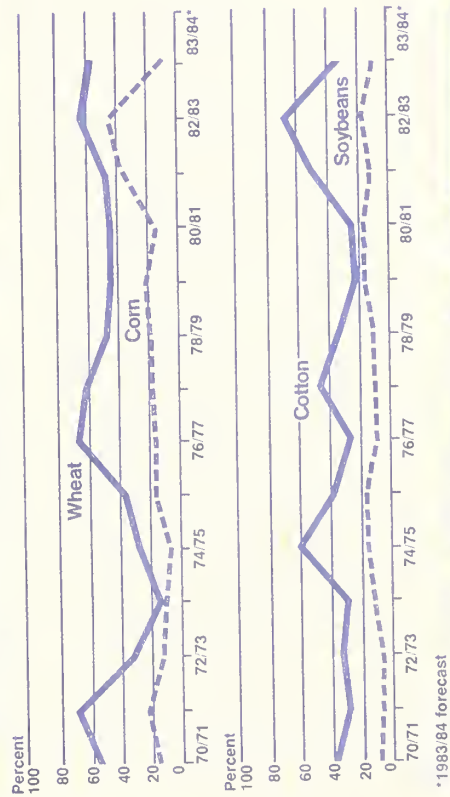
## Milk Production, Use and Prices



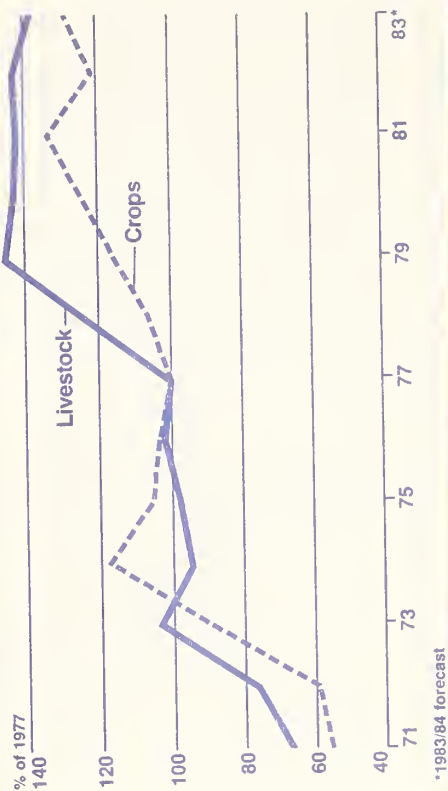
## U.S. Agricultural Exports Volume and Value



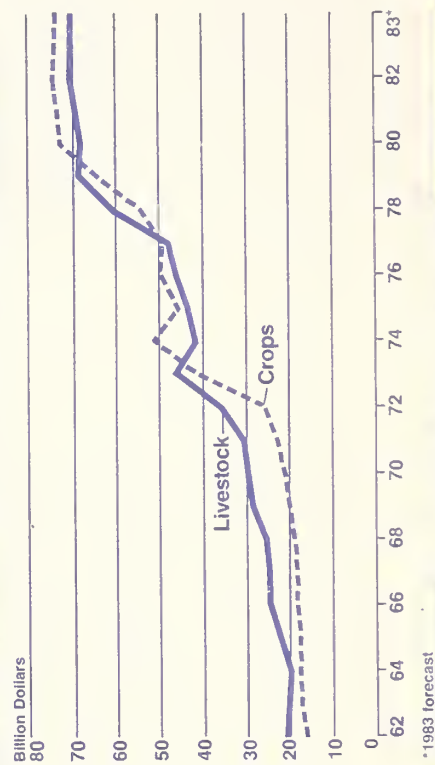
## U.S. Stocks/Use Ratio, 1970-1984\*



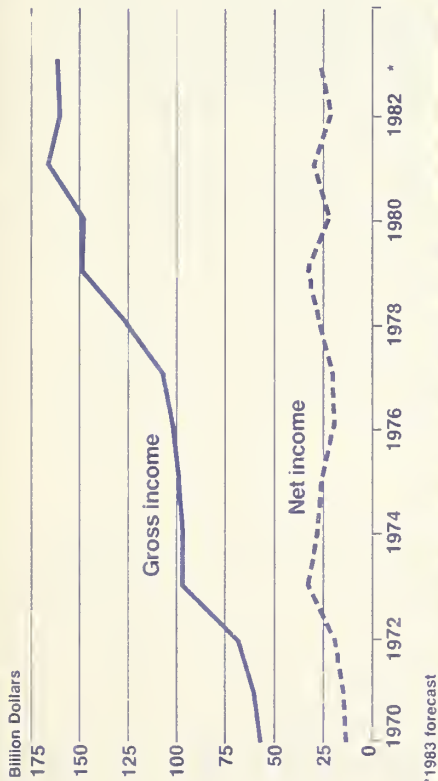
## Prices Received for U.S. Farm Products



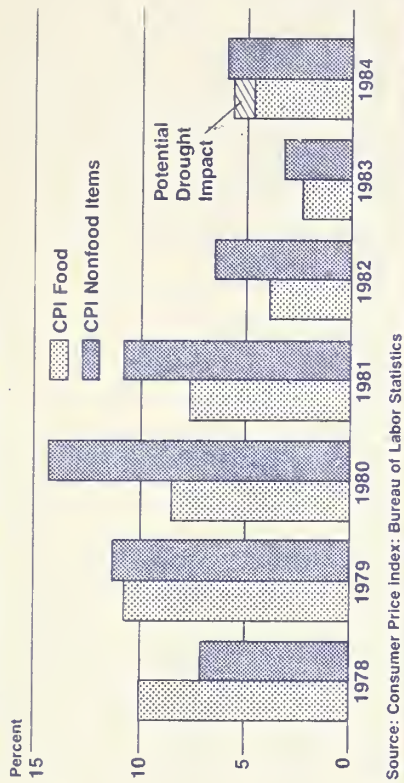
## Cash Receipts From U.S. Farm Marketings



## U.S. Farm Income



## Increases in Consumer Price Indexes Food Versus Nonfood Items



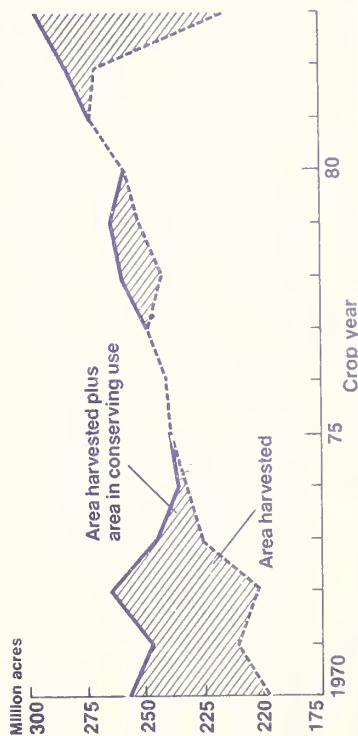
## Program Participation in Acreage Reduction Programs: Actual 1982 and Indicated 1983\*

Item	1983	
	Total Participation	PIK <sup>1</sup>
—Percent of base—		
Wheat	48	50
Corn	29	60
Sorghum	47	60
Rice	78	85
Cotton	78	75

<sup>1</sup>Percent of base acreage utilizing PIK program.

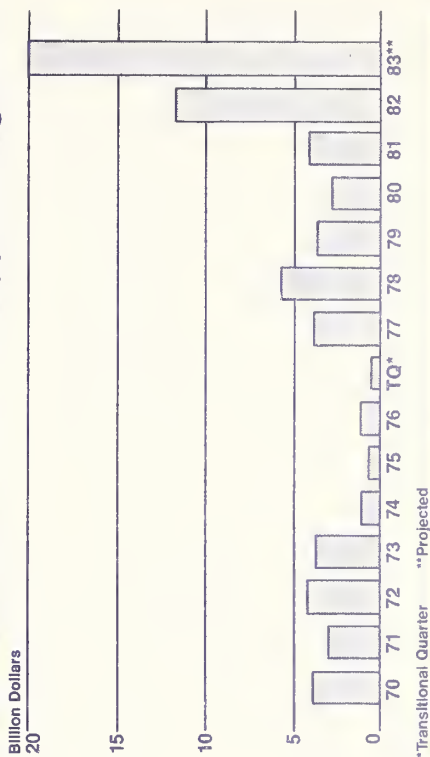
\*Producers removed a total of about 75 million acres from production in 1983, up from about 11 million in 1982.

## Area Harvested Plus Conserving Uses, 1970-83



Note: Shaded area shows acreage in conserving use.

## Net Outlays for Farm Price Support Programs



\*Transitional Quarter \*\*Projected

## Major Factors Shaping Agricultural Outlook

### Supplies

- Global Crop Response to Higher Prices
- Livestock Production Adjustments

### Demand

- Pace of World Economic Recovery
- Changes in Debt Levels, Interest Rates, Inflation

### Policy

- Domestic Farm Program Adjustments by U.S. and Other Countries
- Trade Policy Adjustments by U.S. and Other Countries



Daniel G. Amstutz, U.S. Department of Agriculture

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After the decline of the past 2 years, we are projecting an upturn in U.S. agricultural export values to perhaps \$39 billion in fiscal 1984. That would be about equal to the level of 1982 which was the third highest in our export history, and 12 percent above the \$34.8 billion figure for 1983.

However, the rise probably will result from higher prices, not larger volume. Sales volume is expected to decline for the fourth year in a row, perhaps by 3 percent to 140 million tons, because of tighter supplies in oilseeds and factors that adversely affect our competitive position. These factors include problems created by high interest rates, the strong dollar, trade practices by other exporting countries, and others that I will discuss.

#### The Situation at the Outset of the 1980's

The decline in U.S. exports since 1981 has been disappointing--but, on reflection, perhaps it should have been expected.

During the 1970's and in the early 1980's, U.S. exporters had just about the best of all possible worlds:

--U.S. producers harvested large crops in 1981 and 1982 while a number of our competitors and major import market areas were having production problems. The Soviet Union, for example, had four consecutive years of grain production difficulties.

--Big new markets also were opening up for our products in the less developed, developing, and central plan countries, because of the ready availability of cash and credit.

High oil prices allowed the OPEC nations to spend lavishly on imports of all sorts. And developing nations, even those without oil resources, had no trouble obtaining generous loans from governments, international organizations, and the international banking system. They chose to use many of these loans for consumption purposes--improving their dietary standards through imports.

The central plan countries also began to heed the requests of their consumers for better diets. The Soviet Union imported large quantities of grains and Eastern Europe and China also entered the international marketplace in a big way in the late 1970's.

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Credit was generously provided to meet the agricultural import needs of some central plan nations. For example, the United States extended \$640 million in export credits to Poland in fiscal 1981, which helped that country become one of our top 20 agricultural markets.

--And finally, the dollar, which declined during most of the 1970's, hit a low in 1980 and 1981 measured against major world currencies. That gave U.S. agricultural products an added advantage in the international marketplace.

Perhaps the beginning of our current export problems was the embargo on shipments to the Soviet Union imposed by the Carter Administration in 1980. This provided incentives to other exporting nations to increase their production in order to serve the Soviet market and jeopardized the United States' reputation as a reliable supplier.

#### The Situation During the Past Two Years

Since that time, world production has increased and demand has suffered a setback because of a global recession and the related credit crunch.

Anti-inflation policies and programs enacted by governments around the world have taken much of the steam out of demand. Real growth in developed and developing countries began slipping, then dropped sharply, in the early 1980's. By 1982, the world was in a full-fledged recession.

The recession hit the developing nations, with their heavy debt loads, especially hard. Debt service ratios for some Western Hemisphere countries currently represent 40 to 50 percent of their export earnings. With little foreign exchange to spare, many once booming markets now need heavy infusions of foreign credits simply to maintain their level of imports, much less increase their purchases.

In contrast, world agricultural supplies have grown faster than demand. Government policies in two of the world's largest agricultural nations--the European Community and the United States--have provided incentives for production that are greater than market realities would indicate.

Other countries have encouraged production increases as well. This year foreign production records are in prospect for wheat, coarse grains, oilseeds, and cotton. However, production is down in the United States, because of drought and the PIK program. Nevertheless, because of large beginning stocks of the PIK commodities, there are adequate supplies in these areas to meet likely utilization levels.

#### The Market Now

The somewhat tight supply situation in the United States, primarily for reasons relating to the drought, will complicate life for U.S. exporters in fiscal 1984.

We may, in effect, be a relatively high-priced island in the international sea in some commodity sectors, particularly oilseeds and oilseed products.



We will also feel a double whammy from the continued strength of the U.S. dollar. It will make our products relatively more expensive in terms of foreign currencies. As a result, many of our traditional customers will not only be buying less because of economic conditions, but their reduced purchase levels are apt to contain more of our competitors' products.

High interest rates are one of the horses pulling the cart of the strong U.S. dollar. Until we bring the U.S. budget deficit under control--and until less developed countries generate more economic vitality and international capital protectionism abates--I see little likelihood of much change in the dollar's position.

As long as the Federal government is borrowing heavily in U.S. money markets, interest rates will be stronger than we would like to see as government and private investors compete for available funds. The resulting relatively high interest rates--and the added fact that the United States is a safe haven for capital--will continue to attract foreign capital, and goods, into the United States. And that, in turn, will maintain the strong position of the dollar.

The United States' competitive position also is weakened by the use of unfair trading practices on the part of other nations, and domestic farm programs that tend to price us out of world markets.

To enjoy the success in exporting we desire--not just in 1984, but beyond--we need to do three basic things:

(1) Check the growth of these unfair trading practices, especially the subsidies that other nations are using to move their surplus production into many of our traditional markets;

(2) Induce other countries to remove protectionistic trade barriers.

(3) Develop a farm program that will promote solid, sustainable growth in our overseas sales over the long term.

I'd like to discuss each of these issues, since they are so crucial to the U.S. export future.

#### The Subsidy Issue With the European Community

The European Community is in a very strong trade position today. It is an aggressive exporter of sugar, dairy, and poultry products; beef and veal; and wheat and wheat products. However, the EC's export strength has been built upon a policy of high internal support prices and large export subsidies--rather than upon true competition in the marketplace.

The EC's expenditures on export subsidies have increased nearly six-fold since 1975 and will likely top \$6 billion in 1983.

USDA analysts calculate that the Community's Common Agricultural Policy (CAP)--with its levy system and export restitutions or subsidies--costs the United States some \$6 billion a year in lost trade. That translates into a loss to U.S. farmers of \$2-3 billion in net farm income and an increase of \$1-2 billion in U.S. government payments.

If production and trade conditions are unchanged over the next 3 years, we estimate U.S. export losses because of the CAP may reach \$8 billion a year by 1987.

We are working with EC policymakers on a regular basis in an effort to resolve the subsidy issue. A U.S.-EC working group has been established to address the issue of agricultural export subsidies with a view toward strengthening GATT rules in this area. A meeting of this group is scheduled in Brussels in early November.

While these talks are going on, we are trying to meet the EC competition with aggressive credit programs and the selective use of subsidies. We have no desire to engage in a trade war with the EC--but we will not cede world markets to those who would attempt to buy them via export subsidizing practices.

The EC's expenditures on export subsidies are now high enough to cause budgetary problems for EC policymakers. As a result of this, the EC is talking of CAP reform.

#### CAP Reform Issues

In this regard, we are deeply concerned about recent EC proposals that would restrict imports of several agricultural commodities of importance to the United States.

As part of its debate on the reform of the Community's Common Agricultural Policy (CAP), the EC Commission has proposed to tax the consumption of all fats and oils other than butter. Thus, the EC is proposing that the United States, and other third countries, shoulder some of its internal financial burden.

In our view, the proposed fats and oils tax could be the first move in a concerted attack to reduce imports of U.S. oilseeds and products. These are currently worth some \$4 billion annually.

I spent the first part of this month in Europe talking with leaders of the European Community and its member states about the U.S. position on the fats and oils tax proposal--and also about the proposal that would restrict the movement of non-grain feed ingredients to the Community.

Our corn gluten feed and citrus pellet exports are currently worth about \$700 million annually--which means our losses could run to \$3-1/2 billion or more over the next 5 years if the EC tampered with our duty-free binding on these products.

We view both proposals as serious issues of principle and have so informed the EC. We will respond appropriately should the EC take unilateral action in either of these areas.

This subject is important to other exporters as well as the United States. The developing world is anxious about the proposed fats and oils tax, for example, and these countries are working with us through the U.N. Food and Agriculture Organization and in other ways to register their objections.

## The Trade Access Problem With Japan

Market access is our No. 1 trade problem with Japan. Japan is our biggest agricultural export market--but the bulk of its purchases from us are raw agricultural commodities. Because of strict quotas and high duties on imports of some high-value agricultural products and restrictive internal distribution methods, it is extremely difficult for U.S. exporters to realize their full potential in the Japanese market.

For several years we have held frequent meetings with the Japanese regarding these import restrictions, in particular those for beef, citrus, and wood products.

We continue to press the Japanese for removal of the quotas and for the elimination of tariff and non-tariff restrictions. There has been a little progress in some areas, but none on beef and citrus, and too little on wood products.

The U.S. trade deficit with Japan has reached staggering proportions. A principal reason for this is the freedom of access Japan enjoys to the U.S. market. This freedom includes no restrictions on distribution, marketing, and investment activities within the United States. We are asking Japan to be fair and grant the United States similar freedom of access to the Japanese market that Japan enjoys here in the United States.

We are monitoring trade restrictions in other markets as well. The United States is pressing for changes where its trading rights are being hurt or where technicalities such as sanitary and health regulations are being used in an unreasonable way to restrict trade.

## Domestic Farm Policy Concerns

Current farm policy, embodied in the Agriculture and Food Act of 1981, has been working against farm exports. The reason: our current farm programs encourage farmers to respond to government signals rather than market signals.

Apparently, the drafters of the 1981 Farm Bill assumed double-digit inflation would be with us forever. As a consequence, they mandated increases in support levels that have left us with prices above market-clearing levels for some commodities during the recent slump in world trade.

As we have been providing farmers with the price incentives to produce more, we have been pricing ourselves out of the international marketplace!

To add to the injury, U.S. support levels provide an incentive for competing countries to produce more.

When U.S. price supports are above world market levels, competitors can establish prices just below those in the United States and capture markets. The appreciation of the dollar has enhanced this advantage.

So it is no wonder that our competitors have not acted to curtail production even in the face of record-large stocks of many commodities, and that u.s. agricultural exports have slumped more than 20 percent in the past two years.



If we are to regain our export momentum in the years ahead, we must modify U.S. farm programs so that producers can receive accurate and timely market signals and be free to act accordingly.

We also need to do what we can to see that farm programs do not put us deeper into the budget deficit hole which is giving us high interest rates and a strong dollar.

A ratcheting up of target prices when not warranted, when inflation really doesn't exist, is the type of thing that prevents us from getting out of this hole. American agriculture has a very real stake in lessening the cost of government--and thus in lessening the upward pressure on interest rates and the value of the dollar.

### Positive Developments and Challenges

The new long-term agreement with the Soviet Union--which calls for a 50-percent increase in the minimum quantities of grain that will be sold to the USSR and should enhance the sale of other farm products to the Soviets--is a very positive development in the U.S. export picture. Likewise, I am optimistic about an improvement in farm product trade relationships with the Chinese. China, with one-fourth of the world's population, represents a market of enormous potential.

Nonetheless, we still have serious export-related problems, despite the expected upturn in export values next year. If we are to regain our momentum in terms of the volume of sales and market penetration, we must arrest the world's drift toward greater trade protectionism and trade distortion. We also must modify our own farm programs so that they are more market sensitive--and so that the price umbrella we provide other exporting countries is eliminated.

### The Commodity Outlook

At this point, I shall summarize the outlook for major export commodities.

Wheat and flour: We look for a slight increase in both export quantity and value, to nearly 39.0 million tons (wheat equivalent) and \$6.4 billion, respectively, in fiscal 1984.

Global import demand will be larger. We anticipate stronger demand in North African markets, and U.S. exports to the Soviet Union will improve as a result of the higher purchase level specified in the new long term grain agreement signed this year. Gains in these markets should more than offset declines we might suffer elsewhere from increased competition from the European Community and Australia.

The Australian wheat crop is forecast at a record 19 million tons, about a million tons above any previous outturn. Consequently, Australia is expected to intensify its marketing efforts throughout the world.

Stronger import demand for wheat for feeding is also a strong possibility, in light of the tight global feed grain situation and high corn prices. The price gap between wheat and corn has narrowed significantly in recent months.

Coarse grains: Coarse grain exports are projected to rise to about 55.5 million metric tons valued at over \$8-1/2 billion in 1984. In contrast to wheat, there may be somewhat less competition in the feed grain market in the early part of the season because of smaller crops and reduced export availabilities in South Africa and the EC.

However, Southern Hemisphere production probably will be stimulated if prices remain strong, and this may bring about a sizable increase during the latter half of the fiscal year.

Short barley harvests in key exporting countries such as the EC, Turkey, and Syria, will not only reduce competition in the Middle East but improve U.S. sales prospects to these traditional exporting countries.

--Unfavorable coarse grain harvests in Eastern Europe and in less developed countries such as Mexico will mean increased import needs. However, because of these countries' hard currency constraints, the extent of the increase will depend on the availability of credit.

Oilseeds: The latest USDA forecast puts U.S. exports of oilseeds and products in fiscal 1984 at 27.4 million tons, down a fifth from last year primarily as a result of reduced supplies. However, higher prices for the smaller 1983 crops will push the value of our sales to around \$10 billion, up more than \$1 billion from fiscal 1983. The current fiscal 1984 forecast equals the previous record set in fiscal 1980.

Harvests in the Southern Hemisphere next spring will be an important key to the ultimate level of U.S. sales. Producers in Brazil and Argentina probably will respond to the current strong prices by planting record large acreages. Other factors that will affect the outlook are the timing and strength of income growth as well as fluctuations in the value of the U.S. dollar.

Cotton: U.S. cotton exports are expected to remain about the same in fiscal 1984 at 1.2 million metric tons. The prospect of limited export gains reflects:

--increased foreign production, particularly in China;

--increased cotton yarn exports to major U.S. cotton markets by such large producers as China, Turkey, and Pakistan;

--stagnant import demand in several major markets, including Japan and South Korea;

--and a significant increase in U.S. domestic use of cotton, despite the smallest prospective crop in more than 20 years.

However, stronger prices for the 1983 crop will probably push the value of our exports to \$1.8 billion, up 6 percent from this year.

Tobacco: The current outlook for unmanufactured tobacco exports in fiscal 1984 suggests that they will be down slightly from 1983 levels to 240,000 tons and about \$1.4 billion. Record large world stocks, a strong dollar, high prices compared with other exporting countries, and increased competition from countries such as Brazil and Zimbabwe will continue to complicate life for U.S. exporters.

Fruit and vegetables: USDA forecasters believe that U.S. horticultural sales may improve in 1983/84, rising to 3.1 million tons worth \$2.8 billion.

During the past 2 years, our horticultural product exports have faced much the same problems as other commodities--contracting global demand because of the worldwide recession, the increasing value of the dollar, the closure of markets in debt-plagued developing countries, and the adverse effects of EC subsidies for raisins and canned fruits, among other items.

Much of the gain forecast for 1984 will result from increased prices for tree nuts.

Export growth should be the strongest in markets where some economic improvement is likely. We see particular promise in Asian markets such as Japan, Singapore and Malaysia, as well as Canada.

Sales to Europe, which have been declining during the past 2 years, may hold their own or even expand somewhat, thanks to the higher prices of tree nuts and canned fruit and the short European apple crop.

Livestock and poultry: We should see some improvement in exports of dairy, livestock and poultry in 1984 as economic recovery spurs world demand. Our sales have been hurt in the past few years by the weak economies in a number of our markets, the strength of the U.S. dollar, and subsidized competition.

We are currently projecting exports of dairy, livestock, and poultry products to recover to more than \$4 billion.

The value and volume of beef and variety meat exports should rise. A recovery is also expected for lard exports, which were small last year. For dairy products, the biggest increase will be for nonfat dry milk moved under the Section 416 donation program.

There probably will be some slippage in the volume of pork and tallow and grease exports. Competition for Japan's pork market will be very stiff. Denmark will be back in the market in force now that Japan has lifted its restrictions against Danish pork. The Danes doubtless will be striving hard to recapture the No. 1 position they held in that market before the outbreak of foot and mouth disease in 1982. In addition, increases also are likely in Japan's own pork production.

Tallow and grease exports, though they may decline in volume, probably will increase in value as prices move up along with those for vegetable oil.

END



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## TECHNOLOGY AND HOUSEHOLD PRODUCTION

Most people assume that technology influences household production. When quizzed on the specifics at the effect, the answers vary with the person asked. On closer examination we discover that "technology" means different things to different people. Researchers are notorious for operationalizing the variable in very different ways. I have seen it referring to industrialization (Manning, 1979), urban or rural residence (Vanek, 1978), ownership of a total of three appliances (Morgan, 1966), and availability of durable and nondurable goods and services (Bose, 1979). In addition, the inferences that some writers/researchers draw from their investigations are sometimes opinion rather than based on statistics, or call for uncomfortable assumptions.

In order to measure the effect of technology we need to measure either what is and what has been or compare measurements with and without whatever our definition of technology is. It is here that the first of several problems arise. What exactly should be measured when we speak of household production? Ideally, one would do it as one would study the economics of the firm and measure output. Output would then be defined as the number of units of something produced (items or loads laundered, meals served, children raised). Traditionally this approach has been avoided. (1) Inputs to household production have frequently been studied. Care must, however, be taken to realize the differences between the inputs to household production and what is actually produced. Equal inputs do not assure equal outputs. For example, the same time of the homemaker will not assure the same quantity and/or quality of food produced.

Looking at Morey's work on energy expenditures for women (1936), we might conclude that technology influenced household production by decreasing the average number of Calories per kilogram per hour required by women to perform certain tasks.

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Sweeping a rug with a broom required 4.38 C/kg/hr compared with 2.60 for using a carpet sweeper. Washing clothes by hand and wringing them with a hand wringer required 2.97 and 3.03 C/kg/hr compared with 2.44 for filling and emptying the tub and 2.03 for using an electric wringer. However, sewing by machine called for 1.65 compared to 1.47 C/kg/hr for sewing by hand. Steidl (1975) states that technological changes such as hot and cold running water, central heating, electricity, and refrigeration had greatly reduced the physical aspects of household work. She does, however, remind us that there are cognitive, affective, and temporal costs to household production as well. In a 1967 study of young homemakers, Steidl found that the largest percentage of wives cited having equipment as an explanation of what made a homemaking task uncomplicated. This response might be expected from a sample composed of recently married, primarily students and renters who might be lacking some desired equipment.

In an historical approach to household production, Manning (1979) reminds us that as the Industrial Revolution removed men from the home to work in the factories and mandatory education laws removed children from the home to the schools, the wife was the only remaining person flexible enough to coordinate family activities from the home. As the transportation system made technological advances, families moved farther from the factories, lengthening the time husbands were away from home and further isolating the wife and therefore, INCREASING her responsibility for home production.

Time frequently has been studied as an input to household production as it is more easily measured than energy requirements and perhaps it is better understood. Looking at the effect of technology on time used for household production gives different results not only during different periods in history but in different studies as well.

Studying the laundry time costs, Wilson (1930) found that Oregon women spent the same amount of time ironing whether they had stove-heated irons or self-heating irons. However, she does state that homemakers in "well-equipped homes," i.e., those with running water, drains, washing machines, and self-heating irons, spent less time in laundry activities than homemakers without this technology when "due allowance" was made for differences in the average number of persons in the household. How that "due allowance" was calculated was not stated. Sater (1934) found that Washington women who washed dishes by machine used less time and had more satisfying results than when dishes were hand washed or sink spray was used.

According to Vanek (1978), high and low status, and rural/urban residence were once distinguished by the use of equipment, servants, and services. Defining social status as income and wife's education, she found that less time was spent in household work in low-income families than those with high incomes,

but also that better educated women spent less time than women with less education. If availability of technology were related to higher incomes, it would appear that technology increased time to home production. When looking at individual categories of household work, the effects of income are inconsistent within categories, often with wives of very low and very high family incomes spending less time and middle-income wives spending more time.

Comparisons of time used for household production between the earlier and more recent studies are hampered by lack of raw data. Mean values were reported without standard deviations, making comparisons difficult. Families of varying size and demographic characteristics were included in samples. Despite these obstacles, Walker (1969) attempted to make some comparisons. Her conclusion:

"Even after discounting variations in methodology and sampling, total time-use clearly has not decreased" (Walker, 1969:622).

This appears to be an "eyeball estimation" based on mean figures with no standard deviations nor control for other variables. There is some discussion of the changing "mix" of time used for household work. Although later reports of the landmark Walter Study (Walker and Woods, 1976) report frequency of use of various pieces of equipment, no reference is made to relationship of use of equipment to time used in related work activities.

Not surprisingly, Hall and Schroeder (1970) found no significant relationship between total time in all household work and ownership of a vacuum cleaner, clothes washer, clothes dryer, dishwasher, and garbage disposer. When studying time used for dishwashing, however, users of dishwashers spent 4.9 hours per week while nonusers spent 6.3 hours per week in dishwashing activities. This result agrees with the finding that dishwashers significantly (2) accounted for the variance in time spent in dishwashing activities from 1967 to 1977 in two-parent, two-child households in New York States (Sanik, 1981). Ownership of clothes washers and dryers did not explain variance in time spent in clothing care activities, although time used in both these activities decreased from 1967 to 1977 (Sanik, 1981).

Defining household appliances as owning or having access to a clothes washer, clothes dryer, and/or dishwasher, Morgan, Sirageldin, and Baerwaldt (1966) stated that having more than one of the three appliances has little effect on the average of all families, decreases the household production for one-person households, and increases the household production for families with four or more persons. The authors make some questionable assumptions without any statistics for backup:



"Most probably having an automatic washer or clothes dryer saves housework time" (p. 111).

"It is doubtful that a dishwasher saves any time" (p. 112).

Using multiple classification analysis, Robinson (1980) found that microwave ovens, dishwashers, clothes washers, clothes dryers, freezers, vacuum cleaners, sewing machines, and garbage disposers did not explain significant differences in time spent by women in household work activities. Nickols and Fox (1983) found that capital equipment was not purchased more often by employed women (seemingly more concerned about "buying time") than nonemployed women.

Stafford and Duncan (1977) state that in selecting a technology to produce nonmarket outputs, i.e., household production, market inputs should increase relative to own inputs as human capital increases. Using logit, they found that owning a dishwasher and a clothes dryer was related not only to income (as expected) but to wage rate as well.

In order to better understand the effect of technology on inputs to household production, a measure of output is desirable. Knowing the output allows consideration to be given to slow versus fast, experienced versus inexperienced workers, and differing equipment or technology. Under the assumption that a rough estimate was better than no estimate, I have used data from an eleven state time-use survey (3) to develop several efficiency ratios for the use of various pieces of equipment in the preparation of food in the home. The efficiency ratios were a measure of output divided by the total time input in food preparation and dishwashing by the total family for a recall day. Output of food production was measured in four ways: number of meals served (4), number of persons served on the recall day; number of items served; and number of servings (people served at a meal x items served). Each efficiency ratio was computed for families who actually used the appliance at least once on the recall day and for those families who either did not use or did not own. Appliances considered were top of the range, oven, broiler, microwave oven, charcoal grill, and any small cooking appliance. T-test at .05 level of significance was then used to determine difference in ratio means between use and nonuse of the appliance. The only appliance that indicated more output per minute of input of all family members was the use of a microwave oven. This efficiency was shown only when number of meals and number of items served were used as the measures of output (Table 1). The non-use of an appliance resulted in higher efficiency scores than the use of top of the range and of the oven for all four measures of output, and the charcoal grill for number of meals only. The use of the broiler, and small appliances yielded no significant differences. Note that no control was used for number of items

or number of meals requiring cooking. As only aggregate daily food preparation time was available, study of individual effects was not possible.

It can be argued that some appliances "save" time. The important element is, however, is time of the worker saved? One might even pose the question, "Is time of the PRIMARY worker saved?" Addressing the latter question first, it has been speculated that increased technology, for example the microwave oven, would increase the time of husbands in household production, as they would be interested in trying the technology. When looking at the time husbands spent in food preparation and dishwashing in households with and without a microwave oven, there were no significant differences. The use of a charcoal grill did, however, increase husbands' participation in food preparation (23.0 minutes compared to 7.5 minutes per day with standard deviations of 30.5 and 18.4 respectively). Thrall (1970) and Bose (1979) warn that technology decreases the likelihood that changes in the traditional division of labor will occur.

While a convection oven may cook some foods faster than a conventional oven and a microwave oven may cook some foods faster than the range, the time that the worker must devote to the task may not change. If technology is measured by the development of new products, the technology of small food preparation appliances may increase the amount of time devoted to preparing and serving food by changing the composition of store bought goods. The most recent example of this is buying more flour and eggs, and using a pasta maker instead of buying commercially made pasta. Consider also the use of yogurt makers, food dehydrators, ice cream makers. Davis (1956) reported equipment considered to be most time-saving in 1936 and 1952 (Appendix 1). Compare her list to a list of portable appliances with heating elements and with motors (Appendix 2). Which decrease inputs to household production? Which appliances change the efficiency of household production by increasing output? Which appliances "make more work"?

## THE FUTURE

To this point I have presented information about technology (defined in as diverse ways as having running water to having a microwave oven) and its effect on human energy, time input, output, and efficiency ratios. The results have been dependent on definition of technology, type of effect, and interpretations of the writers. These effects on household production are largely based on yesterday's technology. Many of the "new" appliances on the market are adaptations of something "old" such as the Belgian wafflemaker or the peanut butter maker or the convection oven.



Today's technology is more information or service oriented than product or good oriented. In the years to come technology will provide more information and control of things in our immediate environment. Microprocessor-based control systems will regulate temperature, humidity, and air quality of our homes, secure our property, and economize our energy usage.

Integrated household systems will coordinate the scheduling of energy management and the availability of human input. For example, the clothes dryer will be programmed to run during off-peak demand, resulting in a lower energy usage rate, but also coordinated so that the human user can hang and fold laundry in the morning. In addition, the heat from the exhaust will be utilized to warm the bathroom or other areas of the house upon rising for efficiency in heating.

Sensing devices will open draperies on the south side of the house when the sun rises and close them when the sun sets to maximize solar heating benefits. Similarly, attic fans will turn on when the summer heat reaches a preset temperature, making air conditioning at 4:30 p.m. (prior to the return of our dual-worker family) more efficient.

Passive infrared and ultrasonic motion detectors will alert us to the presence of intruders; place telephone calls to police and to our office. "Panic buttons" can be used to notify neighbors, relatives, or special medical alert teams of illness or accident with the touch of a hand.

Appliances will be accessible from remote terminals by telephone or cable. Within the home, voice commands will activate lights, appliances, mechanical devices such as openers for doors and drapery rods, temperature and humidity control, and information sources. Videotex systems will supply us with information from current news to checking account balances. Robotic arms will do our repetitive tasks, further relieving us of physical labor. It is my opinion that robotic centers will be more practical than portable robotic servants. Imagine if you will, a robotic arm unpacking groceries. Its sensor will scan the universal product code and know where to put the item. When linked to a micro-computer with a menu planning program, it will keep an inventory of supplies on hand and retrieve them at the time of meal preparation.

This type of technology is available now. Its cost in most cases makes it uncommon in the average household. However, just as we witnessed the dramatic decrease in the price of pocket calculators we can expect the price of this new technology to be more affordable. The applications of the "smart" machines are as diverse as the needs or desires of its user. Household production will change in its content and demands on the worker. Emphasis will shift from the actual process of the work to the

planning, programming, and management aspects of the process. It will be the "innovators" and "early adopters" in our society who first deal with these changes. These higher income, better educated families will easily understand the applications. The challenge to those of us in education will be to ease the gaps between the "haves" and the "have nots".

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#### FOOTNOTES

- (1) For a discussion of why this approach has been avoided in the past, see Sanik, M.M. and Stafford, K. "A Product-Accounting Approach to Valuing Food Production." Home Economics Research Journal. 12(2), December 1983.
- (2) Multiple regression coefficient was significant at the .05 level.
- (3) NE 113, Use of Time in Urban and Rural Families.
- (4) "Meals" were defined as any meal or snack requiring three or more minutes of preparation.

Table 1. Efficiency ratios using four measure of output.

		<div> <div>Output</div> <div>Time</div> <div>Ratios</div> </div>			
		<u>Persons</u>	<u>Items</u>	<u>Servings</u>	<u>Meals</u>
		Time	Time	Time	Time
<u>Top of the range</u>					
not used	Mean	.12 *	.16 *	.41 *	.05 *
	(sd)	(.16)	(.21)	(.52)	(.07)
used		.09 *	.13 *	.36 *	.03 *
		(.07)	(.11)	(.27)	(.03)
<u>Oven</u>					
not used		.10 *	.15 *	.38 *	.04 *
		(.16)	(.15)	(.35)	(.05)
used		.08 *	.12 *	.34 *	.03 *
		(.07)	(.08)	(.34)	(.03)
<u>Broiler</u>					
not used		.10	.13	.40	.04
		(.09)	(.12)	(.31)	(.04)
used		.09	.14	.38	.04
		(.08)	(.11)	(.35)	(.03)
<u>Microwave Oven</u>					
not used		.09	.13 *	.36	.04 *
		(.08)	(.10)	(.28)	(.03)
used		.10	.16 *	.40	.05 *
		(.16)	(.28)	(.53)	(.09)

\* Ratios are significantly different (use vs. nonuse) at the .05 level.

(Continued)



Table 1, page 2.

	<u>Output</u> Time		Ratios	
	<u>Persons</u> Time	<u>Items</u> Time	<u>Servings</u> Time	<u>Meals</u> Time
<u>Charcoal Grill</u>				
not used	.09 (.09)	.13 (.13)	.36 (.31)	.04 * (.04)
used	.08 (.04)	.11 (.06)	.36 (.21)	.03 * (.02)
<u>Small Appliances</u>				
not used	.09 (.09)	.13 (.13)	.35 (.34)	.04 (.04)
used	.09 (.08)	.13 (.12)	.37 (.30)	.04 (.04)

\* Ratios are significantly different (use vs. nonuse) at the .05 level.

Equipment	Number of responses	
	1936	1952
Bathroom	1	
Bread mixer	1	
Carpet sweeper	1	
Congoleum rug	1	
Dish drainer	2	
Dryer		1
Dust mop	1	
Electric equipment	2	1
Electric iron	5	1
Freezer	1	2
Grinder	1	
Hand pump	1	
Ironer		1
Kitchen cart.		1
Laundry equipment		1
Mixer	2	3
Mop wringer	2	
Oil furnace		1
Oil stove	2	
Pressure cooker	1	
Range	4	7
Refrigerator	4	3
Running water	3	3
Sewing machine	1	
Steam iron		1
Vacuum cleaner	8	11
Washing machine	9	10
Total	53	47
None	1	
Not reporting	1	

## Appendix 2. Portable cooking and motor appliances, 1983

### SMALL APPLIANCES

#### Cooking Appliances

bun warmer  
coffeemaker  
convection oven  
crepemaker  
deep fat fryer  
dehydrator  
doughnut maker  
egg cooker  
fondue pot  
griddle  
grill  
hamburger cooker  
hot dog cooker  
indoor barbeque grill  
kabobit  
microwave oven  
percolator  
popcorn popper  
    hot air  
    oil  
    carmel corn  
pizzamaker  
pizzelle maker  
rice cooker  
rotisserie  
sandwich maker  
skillet  
slow cooker  
steamer  
tea kettle  
toaster  
toaster oven  
toaster oven/broiler  
waffle maker (regular)  
    Belgian  
warmer  
wok  
yogurt maker

#### Motor Appliances

##### Food Preparation

blender  
can opener  
cookie gun  
coffee grinder  
drink mixer  
food processor  
ice cream maker  
ice crusher  
juicer  
knife  
knife sharpener  
meat grinder  
mixer  
pasta maker  
peanut butter maker  
puréeur  
slicer  
stripper

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For decades, home economists have applied their expertise as new technology was introduced into the home. Electric ranges, freezers, sewing machines, vacuum cleaners, food processors, and the microwave oven were notable points in the technological history of the home. We are at another milestone as millions of homes add a computer to the inventory of durable goods. Now we again have the opportunity to lead consumers and families in a major purchase decision and its application to managing the home.

When has so much attention been given to a piece of home equipment? Weekly newsmagazines and evening television news repeatedly feature the "home computer." Numerous accessories for the user appear in stores and mail order catalogs. "How-to" books for computer users are at the top of the list of categories of best selling books. The bright lights of public attention are turned to this new addition to household technology and, indirectly but more importantly, to the tasks and activities that family members pursue in the home. Home economists can seize this as an opportunity to emphasize the scope and significance of the work performed at home and the recreation enjoyed there. They can again provide the expertise that consumers look to in evaluating the potential of a new product.

#### The Microcomputer as Home Equipment

Despite the relatively recent origin of the microcomputer for home use, the generic product has taken a certain form and shape. The following definitions are offered for the sake of clarity in the paper, but also because they represent usage that is becoming conventional in the industry.

The term HOME computer is appropriately used to describe a system with a central processing unit (computer) with typewriter-like keyboard and some internal memory, connected to a television for the screen display, with a cassette recorder for a storage device, and probably with a joy stick or paddles since games are a likely use of a home computer. Serious applications for home management (budget records, correspondence) are difficult because of the lack of a printer and the lack of clarity in display of text material on a television screen. Home computers as described here would be too limited to warrant all the attention given the introduction of computers into the home, although consumers purchase such systems at very modest cost and then consider themselves participants in the computer revolution.

A PERSONAL COMPUTER system is comparable to that used in a small business. In addition to the computer and keyboard, a monitor provides a clear screen display, a disk drive stores data and programs, and a printer provides a paper copy of output. With such a system, business-like functions are possible in the home in addition to the entertainment and educational activities enjoyed

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on the home computer.

An additional device is a necessity for participation in the world of computer communications--a connecting device (MODEM) to send and receive messages from other computers. The communications function is predicted by many to be the most exciting computer activity on the horizon. Although computer TERMINALS can be purchased at very low cost that allow one to access information networks over telephone lines, using a PERSONAL COMPUTER as a terminal has some advantages: there will be a disk available for storing messages that one wants to keep after the connection with the network is broken and a printer to produce paper copy of text which is needed in the conventional printed form.<sup>1</sup>

### Functions Performed by the Computer in the Home

It is interesting to note the changing importance of the several general functions that computers can perform in the home environment. When microcomputers were first promoted as home equipment, before there had been much descriptive information in the mass media, the applications of this technology that were generally expected were record keeping and the control and monitoring of home appliances and environment. These functions may have come first to peoples' minds because they closely imitated the functions of larger main-frame computers in the work environment. The picture that is emerging is quite different, and will be even more different in the future, as computers begin to take their place as household equipment.

#### Entertainment and education

The enchantment with video games, of course, has been a prime motivating factor in bringing the computer into the home, and a prime reason for turning the machine on once it is there. Game-playing is not entirely evil, by any means. Experiencing this new technology in a fun-and-games fashion overcomes inhibitions, particularly in adults, and provides some intergenerational activity. Of course we should have the usual concerns when any activity is engaged in excessively. For computer users, too much time at the keyboard may mean a lack of physical activity and social interaction.

There is already reason to predict that the simplistic games have lost their initial appeal, except for a minority of insatiable addicts. The educational function of the interactive computer will become as important, or more so, than "blow-'em-up" games. Not only will consumer tastes expand, but the software now appearing in the market generally represents the more stimulating and substantive efforts of the industry, programs that understandably took longer to produce than the first wave of simple-minded action games.

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<sup>1</sup>An excellent product report for microcomputer hardware for home use was presented by Consumers' Union in the September and October, 1983, issues of Consumer Reports.



The entertainment and education potential of microcomputers initially was realized through programming the computer, a truly absorbing hobby. The "hackers" are a tiny minority of computer users now, since commercial software offers such diverse applications few new owners are willing to learn the discipline of a programming language.<sup>2</sup>

#### Processing numbers and words

The business-like tasks of home management--budget records, recipe files, Christmas card mailing lists--seem to have failed in capturing the computer user to the extent predicted. The low-priced home computer system, adequate for game playing, is seriously handicapped in performing such tasks, and the price tag on the personal computer system, as well as the more demanding users' manuals, were intimidating to the middle-class consumer. The market penetration for home computers has not reached predictions. The industry seemed to be taken somewhat by surprise by the sophistication desired in hardware and software by those who purchased a personal computer for home use. It would seem that the computer engineers generally underestimated the serious business-like tasks that must be done in SOME homes, at the same time that they overestimated the market for simple software for budget records in the average home. Word processing has been a far-more popular application than expected and the electronic spreadsheet software (e.g. VISICALC) a good seller even for home use. The incidence of home-operated small businesses and the volunteer efforts to keep non-profit organizations alive (treasurer records, mailing lists, etc.) likely contributed to the demand for business software for home use. (We, as home economists, could say that we've always recognized the importance of such work performed at home by family members--the engineers should have consulted us!)

#### Electronic control and monitoring

Although the more fanciful predictions of some years ago (particularly by those who did not know much about microcomputers) emphasized the electronic home with equipment monitored and controlled by a central computer, very few microcomputer owners have asked their new machines to do any such thing. Indeed, few hardware or software products are offered by the retail computer stores to assist the new owner in using the computer for this purpose. The problems are generally these: most microcomputers can do only one task at a time so if the machine is monitoring the smoke detectors, it can't be used at the same time to update the budget records; special wiring may be needed to bring the operation of appliances under the control of a single computer; customized software will have to be written; malfunctions of the system can have disastrous effects (the lawn sprinkling system runs all the time you're on vacation). A far more reasonable application of computer technology to home control, and the widely prevalent one, is the use of special purpose microprocessors. These tiny pre-programmed "computers" are in our timed thermostats, microwave ovens, automobiles, etc. at far more reasonable cost and maintenance requirements than if we tried to do all of this from a single

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<sup>2</sup>This lack of mastery over the computer by the user concerns some experts, particularly where children are concerned. In his excellent book Mindstorms, Seymour Papert pleads for introducing children to the computer in a manner that leaves them master over the machine rather than the reverse, as tends to be the case with most programmed computer-assisted-instruction exercises.

microcomputer in the home. When considered in this manner, most of us are computer users and we never had to learn a single keyboard command.

### Communications and information

There is much greater interest, and more products, directed toward the communications mode than the electronic control mode. Therefore, one means for being recognized as computer literate is to talk of personal computers interfacing with other computers rather than controlling the coffee pot and monitoring the smoke detectors. The communications and information functions offer the most exciting opportunities for computer use in the home, and are likely to have the greatest impact on home functioning of any application.<sup>3</sup>

One hesitates to even begin constructing a list of what is possible when a home computer terminal is connected to a computer network; the possibilities are infinite so any list is constrained. Information retrieval is one category of use. This could mean something as simple as accessing airline schedules, weather forecasts anywhere in the nation, stock and commodity market prices, et cetera. Essentially, these are the kinds of information that we now seek in either one-way media such as daily newspapers and the morning television news or interactive media such as telephone calls to agents and brokers. And, just as with a telephone call to a stock broker, access to a computer network also allows for interactive use or transactions, the second category of use. So we must think of the many household-to-market transactions that could be done at home: banking, shopping, ticket reservations, scheduling home maintenance services. Information retrieval could also be more ambitious such as on-line searching of encyclopedia or library reference materials.

Then there are the person-to-person communications such as electronic mail, a version of which is now provided to computer users in some metropolitan areas by the U.S. Post Office. Computer users who subscribe to one of the information networks (CompuServe, Source, and several others) have electronic mail services available for communicating with other subscribers as well as the bulletin board where messages can be electronically "posted" for any interested reader.

These services provide a new media for "networking", a form of interaction considered to be of considerable social significance. (See particularly Marilyn Ferguson's comments in "Microcomputer Revolution: Family Friendly?") The opportunity to dialogue with persons in whatever location who share similar interests has great appeal. Although the interaction among members of these special interest groups (SIGs) is through text messages on a computer screen rather than voice communication, this need not be inhibiting. Indeed, there are certain advantages. Physical appearances and mannerisms are of no significance. It is not necessary to go through the niceties of social convention to establish a conversation. The other participants need not be available at the moment you want to talk; they can read your messages and respond when convenient. But, as with so many activities, if the appeal is great so is the potential for abuse. Communication skills essential for social

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<sup>3</sup>B.O. Evans describes in detail the potential and problems in Computers and Communications in The Computer Age. See also the excellent Trend Analysis Report Communications from the American Council on Life Insurance, Summer, 1982.

interaction will not be developed or maintained by those who choose this form of interaction. It is so easy to converse only with those persons who share identical interests, preventing exposure to a diversity of topics. This "narrowcasting" is at odds with the need for broad awareness and understanding among people in our pluralistic society.

Another consideration is the cost of accessing computer networks, a not insignificant matter today when long-distance telephone charges must often be paid. Cable television and satellite communications will provide the transmission media in the years ahead, greatly reducing the cost of information access and communication via home computer terminals. The cost factor is of great significance because of the importance of access to information in this society. It is often suggested that differentiation into social classes may become more a matter of the "know" versus the "know-nots".<sup>4</sup>

Expert systems for decision assistance and behavior modification

The newest direction for home applications for microcomputers is in the area of software designed to provide expert services. These include a variety of programs, for example, one that will prepare a will for you based on information you provide as to assets and beneficiaries. (The promotional message is "Your computer has the power of attorney.") Programs to analyze nutritional content of your diet and to recommend menus are available. Expert programs in the medical area are expanding so rapidly that the FDA has established standards to monitor them because of the danger of misleading diagnoses. (Infoworld, 5:41, p. 33) Therapy for problems with interpersonal relationships or with substance addiction is available in computer software for home use. These are intended to improve mate selection and behavioral problem identification.<sup>5</sup> CompuServe users can now access the Familiae service for help with family problems, either in an individual counseling mode, or through information retrieval. (Infoworld, 5:41, p. 30)

Surely there must be a lot of "tongues-in-cheeks" over the potential for artificial intelligence applications for home and personal use, especially when the promises are so sweeping as those put forth by Smith and Debenham which range from reduction in divorce resulting from mate-selection computer systems to happier and better organized families with increased involvement of family members with one another--all of this because of the use of computer-

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<sup>4</sup>Commentary and debate over the social framework of an information society is found in articles by Daniel Bell and Joseph Weizenbaum in The Computer Age, and in the recent and widely-read Megatrends by John Naisbitt. See also recent popular article by Gerber in Today, and Masuda's The Information Society.

<sup>5</sup>The "Families and Telematics" column in the American Family newsletter edited by Rowan Wakefield provides a continuing up-date on this particular type of application which Wakefield predicts will become the most important application for home users.



assisted decision models.<sup>6</sup> The design of expert systems<sup>7</sup> is a branch of artificial intelligence which is viewed by many as still at the parlor-game stage of development. No one should be too dubious about the potential of electronic technology, and yet a healthy skepticism will assure that we maximize the benefits and reduce the risks. It seems strange that an area as subjective and personal as family relationships should be analyzed through such a constrained and impersonal medium. The potential for expert systems in the financial decision-making realm seem far more promising. Although even here, aspirations should not be too grandiose. A recent Sears promotional for Commodore 64 home computer promises "financial counseling in your home," an ambitious declaration given the commercial software available.

A research project at the University of Missouri intends to develop expert systems for financial counseling. But the intended use of the system will be in the office of a financial counselor, rather than in the home without professional guidance. Even in the financial domain where solutions to the problem are fairly objective, even mathematical, few professional financial counselors would feel comfortable with the extent of expertise captured in a computer program simple enough for a person to use at home. In computer software, sophistication in function is rarely accompanied by simplicity in use. For example, think of an expert system that would assist a family financial manager in making income tax-related decisions and complete IRS forms. How much knowledge would be necessary for the user to understand the information the program requires? What provision is there for the program to be kept up-to-date as IRS rules change? How quickly are updates available following a change in IRS regulations?

Perhaps we should look at something less complex than federal income tax (hardly anything is MORE complex). For example, the financing of a home. The mathematics required to guide decisions in home purchase and financing are easy to build into a computer program. But under current market conditions, the family decision-maker needs to understand at least the basics of balloon payments and adjustable rate financing to use such a program. The problem here is that such decisions are infrequent for a given consumer and the knowledge base is weak for most home purchasers. My university upperclassmen should be more adept at such reasoning than the average consumer, but I have little reason for confidence in their understanding of the nuances of mortgage financing. The point is that there is a need for such computer-assistance but the software should be designed and used by professionals. I see no other way to maintain valid decision-assistance computer software available to consumers in areas that are somewhat complex and/or subject to changes in rules. There may be

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<sup>6</sup>The not-too-convincing justification for these results is in the article in Futures, February, 1963, pp. 33-46, and, more recently, in The American Journal of Family Therapy, 11:1, pp. 16-31.

<sup>7</sup>Expert systems are computer programs that capture the knowledge (data) and reasoning (decision rules) of experts. Such programs may be made available for clients to use, or may serve as computer assisted problem-solving for the expert. In the latter case, the decision rules as well as the data should be subject to modification by the user. Commentary and critique of artificial intelligence applications can be found in Crichton's Electronic Life and in Minsky's "Representation of Knowledge" in The Computer Age.

potential for computer-assisted decision-making following the decision models from the consumer behavior and home management literature. These models would be acontextual; that is they would be designed to guide problem solving in any domain. This eliminates the problem of updating.

### A Role for Home Economists

It is understandable if professionals committed to helping families feel overwhelmed and confounded when such a complex product appears so quickly and is predicted to be as pervasive in its impact as the microcomputer. In the midst of many mandates to become computer literate, it is refreshing to find balancing perspectives such as the book, Computer Choices: Beware of Conspicuous Computing by Covvey and McAllister and this statement by Les Cowan

We hear about the necessity of becoming computer literate with the implication that those who don't will be doomed to permanent career inferiority and intellectual sterility. This is heard mostly from people who are in the business of selling products designed to confer this modern equivalent of divine grace. The hullabaloo about computer literacy is 80 percent marketing and 20 percent the kind of one-upmanship that turns national interest into fear of being left behind when anything new comes along.

But it would be a serious mistake for us to use such statements as excuses for an ostrich posture. We do have commitments to the welfare of the families we serve and to the credibility of our profession. How often we hear it said (and particularly well-said by Alan Mirabelli in "Microcomputer Revolution: Family Friendly?") that we must be in control over the technology we use or it will control us. The answer to the question, "Is the microcomputer revolution family friendly?" seems to be that it depends on us, on professionals that want the best for consumer and families and have the expertise to make the best happen.

Rather than emphasizing what we do not know and should learn about computer technology, we could readily build on the relevant expertise and experiences we already possess. Viewing the computer as another piece of home equipment helps us see that we can be of help with the standard concerns of insurance protection, warranties, financing, leasing, and repair service. Home equipment specialists could easily learn the details of protecting the computer from such phenomena as power surges and brown-outs, without knowing the design of the microprocessor circuitry. We have been of help to consumers with the selection, use, and care of automobiles without knowing a great deal about the gas combustion engine. Similarly, we have not felt the need to teach drivers education; perhaps our efforts are not best expended in the direction of teaching clients to use computers since such instruction is so widely available.

Expertise in using computer software and hardware (not necessarily in programming) will give us a base for evaluating products which, when combined with our present expertise in influencing the design and marketing of products, will enable us to impact on producers so that families are better served by this industry.



We have considerable expertise in disseminating useful information to households. The information networks claim to provide home management information, but we would not likely be favorably impressed with what is available relative to the storehouse of wealth in Extension publications and programs. It would seem to be a clear and present challenge for Extension to make their information base available to households through such a media. Finally, we could guide families in maximizing the benefits of this new technology and minimizing the costs to family relationships. The possibility of the electronic cottage with education and income-earning at home via computers poses as many problems as it does potentials and it is home economists who can provide the leadership in this transition.

Home economists could, and should, be doing all of this. But meeting such a challenge could claim the entire corps of Home Economics Extension Specialists, leaving sparse attention for the multitude of other concerns facing the family. It is essential that we establish a thoughtful perspective and carefully set priorities so that our expertise is focused in the most effective direction. A critical mass of Home Economists must have a high profile in the microcomputer revolution, primarily for the welfare of the families we serve and also for the credibility of our profession.

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Traditionally, home economics Extension programs have focused on helping families use their resources effectively. We are familiar with classes, publications and media efforts on buying, preparing and storing food to obtain the best value for dollar spent. Consumers have learned to sew and handle fabrics, to provide well-fitting, durable, quality apparel and home furnishings economically. Consumers have attended programs on planning for retirement, budgeting, savings options and selecting household equipment and products that best meet their needs. These educational efforts have one aspect in common. Individuals were learning to more effectively use the resources they already had to make them to go further and they were practicing their decision-making skills at the same time.

Cooperative Extension home business programs based on home economics skills are helping people use personal skills to make more resources, primarily dollars. Perhaps this appears to be a new direction for Cooperative Extension, but is it? What is a farm? It is a home-based business. Agricultural Extension programs have traditionally directed efforts toward individual farming operations. More recently, agriculture has addressed home horticulture, especially the home gardener who has a hobby or home ground to care for. Home Economics Extension business programs have evolved in the reverse order.

I realize the concept of home economics involved in programs to help people market hobby-related, particularly home economics based skills is controversial to some. In Extension, the precedent for serving business interests is established in Agriculture. In addition, vocational home economics programs have been in existence in secondary schools for many years. The focus of these programs has been technical skills with little emphasis on developing business skills. University home economics courses of study also reflect business related careers, namely food service or institutional management, fashion merchandising, household equipment, and private day care facilities. Certainly to survive in business, the bottom line is profit, but hopefully the individuals who select a home economics route are more concerned about and more knowledgeable about the needs of families and providing them with the quality of goods and services which best meet those needs.

Home-based businesses utilizing home economics skills can provide consumers with high quality goods and services to meet consumer needs. If the product or service is not satisfactory, the business will fail. Customers use a

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service because they have already evaluated their resources and determined that their time is more important than their money or that their personal skill level is not adequate to achieve the standards they want. Our service oriented society, particularly in the dual career family, wants quality and can often find it in goods and services provided by the individual business person, including those who work in their home.

### CUSTOM SEWING TODAY

Four years ago, Cooperative Extension in Ohio initiated workshop programs on sewing related home businesses. This includes dressmaking, alterations, reupholstery, slipcovers, window treatments, quilts and gift items. The term custom sewers is used to describe this group since it is more inclusive than custom dressmaker. In short, it has been an extremely successful program and has obviously met a need. More than 3500 people have attended specialist taught workshops over a four year period. This does not include participation in subsequent sessions taught by agents or other resource people.

Let's back up a minute, however, and examine the potential for custom sewing businesses. Is it worth the investment of resources by Cooperative Extension as well as the individuals involved in these businesses? The potential for business exists in many communities and for many individuals. It isn't for everyone, but for the person with special talents and interest, it does exist. We have all heard about the little seamstress who sews all day and makes \$5.00 labor for sewing a dress. I'll admit that these people exist, but our programs are working hard to change that situation. Custom sewers can and do make much more. For the person who is willing to sew 35-40 hours a week, \$1,000 a month income is not uncommon or unreasonable. I have worked with custom sewers who earn \$15-\$20/hour and gross over \$100/day. Certainly these people are in the minority but they exist in both rural and urban areas. The individuals don't necessarily have degrees above that of a high school diploma and often started out hemming garments for people. But, they were good and their businesses grew as a result.

Most custom sewers are more likely to make \$4-\$7/hour. Potential for a higher income exists, however, particularly when they are good or if they specialize. These specialties include sewing for clients with larger figures, tailored apparel for the career or professional woman, imitation suede apparel, canvas repair including awnings and boat coverings, reupholstery or slipcovers. Other specialties exist.

The people who attend custom sewing workshops are seldom the little dressmaker who sits at home and sews. They are serious professionals. About half the people who attend are already in business while half are considering getting started. Those already in business are delighted that someone considers them professionals. They are delighted with the recognition that they are legitimate business people with a service of value to sell. They have been out there on their own for years and find they are not alone. Other custom sewers have the same problems as they do and sometimes solve them in the same way. They ask good questions. They want to know about copyrights, licensing, zoning, insurance, legal advice, accountant services and ideas for handling that problem customer. In short,



they are not in business for pin money. Their income is making a sizable contribution to the family's income and well being and they feel good about it.

Some problems do exist, however. Many individuals possess the technical skills but have little business exposure or experience. Some people realize this, others do not. Many custom sewers have little sense of worth. They are afraid to charge fair rates. Because they know the special skills required, they do not think of them as having value. We all realize that many skills are easy when you know how, but when you don't know how, the admiration for those who do is greater. Helping custom sewers look upon their talents as having value, marketable value, is sometimes critical. If they don't value their abilities, how can they expect their clients to. Our programs try to develop this attitude and feeling of professionalism.

#### CUSTOM SEWING: A WORKSHOP FORMAT

Custom sewing workshops in Ohio address the business aspects and family concerns of custom sewing businesses in the home rather than technical skills. The College of Administrative Science at The Ohio State University and the U. S. Small Business Administration have been involved with developing segments of the initial workshop. Planning committees are utilized frequently to tailor programs to local needs. In fact some of the best workshops and improvements in the workshop format have come as a result of local committee input.

Initial workshops are one day long, usually from 9:00 a.m. - 3:00 p.m. Two urban programs have spanned two full days and involved several concurrent special interest sessions on the second day. In rural areas, an average attendance is from 75-100 people. Two hundred and fifty to 300 participants is more common in urban locations. In fact a program in an urban area with high unemployment attracted 320 participants in 1981. To date we have reached over 3500 people at programs in 23 locations.

The first session at workshops, "Is Custom Sewing for You," helps individuals focus on and evaluate their own situations. Topics examined include personal qualities, family considerations, professional commitment, market potential, and benefits of home businesses. A panel of successful custom sewers representing dressmaking and home furnishings related businesses follows. These custom sewers offer practical information to participants as well as add credibility to the program content.

Occasionally it is difficult to identify successful custom sewers to serve on panels. This is especially true in less populated areas. Panelists should have a sound business philosophy and business sense as well as speak easily before groups. Workshop participants have been vocal when panelists did not meet their business standards. To deal with this concern, a 44 minute video tape with a successful custom sewer was made and is used when local panelists are unavailable.

Ohio Cooperative Extension works closely with the U. S. Small Business Administration and has involved this agency in virtually all its small business efforts. SBA speakers participate in workshops and address

business considerations including establishing goals and objectives, record keeping, licensing and government regulations, zoning and insurance as well as special SBA services available to business persons or prospective business persons.

The final session on selling strategies considers specialization, marketing, advertising, competitive pricing, work agreements, and working with customers. Sound business principles are taken and related directly to custom sewing in very specific examples. In short, participants are exposed to and can relate to the information in a very practical manner.

Let me comment a minute on our cooperative efforts with the Small Business Administration. The relationship has been beneficial to both organizations and is an outstanding example of a program that utilizes the strengths of both. SBA knows business and has the resources to assist individuals with related problems and concerns. Cooperative Extension knows sewing and adult education and has a history of very practical approaches to learning. Cooperative Extension also is a credible source to home sewers and can attract individuals who might not otherwise attend general Small Business Workshops. Both organizations, SBA and Cooperative Extension, make an excellent team in this program effort. We cooperate on a regular basis not only with formal workshop programs but also by referring individuals to each other depending on the specific assistance needed.

The unique aspect of the Sewing for Profit program in Ohio Cooperative Extension is that it is subject matter based rather than general. SBA has commented that they seldom have such large audiences with the same interests or types of businesses. As a result, presentations can be tailored to very specific needs. The fact that the program is subject matter or department based, in this case the Department of Textiles and Clothing, adds credibility and confidence. Participants have approached me following workshops with comments like, "This was very helpful. You know sewing. We can tell." The fact that business principles can be related very specifically to both sewing based businesses as well as business located in the home is a strength, especially since most participants have had little or no past experience in business.

#### PROGRAM EVALUATION

What does interest in home-based custom sewing businesses mean? Is it a fad, a popular program to attend passively, or has it made a difference? A delayed evaluation form was developed and has been used by many, but not all, counties offering the program. The evaluation form is mailed to participants 3-4 months following the program. A response rate of from 37%-82% has occurred with around 50% being average. One question we ask is, "One of the goals of the workshop was to help you increase your income. Do you feel you have been helped?" About 50% of those returning evaluations or 25% of those attending the programs respond that they have. Considering the fact that small business is not for everyone and that the evaluation is mailed just a few months following the program, increased income by 25% of total attendance is good.

As a result of the program, we know of individuals who have started their own businesses and of many more already in business who have taken specific

actions. They have raised prices, decided to specialize, investigated insurance coverage, obtained vendors' licenses, improved record keeping practices and expanded marketing approaches. A comment from one custom sewer read, "Since the workshop I keep more regular hours and I'm checking into an answering machine for my phone. Plus I always have on a uniform or white smock when I receive customers and make sure my hair is neat and makeup on. I have been busier since the workshop, despite the fact that I went right home and raised my prices. My customers didn't seem to mind."

Workshop attendance includes individuals of all ages. We have teens from vocational high school programs to senior citizens. We also have individuals who work with senior citizens to help market their work. The breakdown for young adults and mothers and for middle age individuals is about the same. A few men show up at workshops. They are often retired or work with their wives on home furnishings related business. With extremely high unemployment in some areas of Ohio in the past few years, the interest and involvement of men in these skill-related home businesses has increased.

An optional question on the evaluation asks for total family income. About 20% of the people attending have a total family income of less than \$10,000 per year with at least one to four people in each class at \$5,000 or less. This is not total income from sewing, which also is on the evaluation, but total family income. We are attracting people who critically need to increase their income.

I would like to add one quote from an evaluation which I believe is important in relation to Extension's history in addressing or adapting to changing needs in the community. It is, "This (program) comes at a time when alternatives for surviving are becoming extinct; this was a light in the darkness." These programs offer hope. They come from a credible source that traditionally has offered very practical information specifically adapted to the situation. This is exactly what Extension does best. We know our audiences. We can adapt educational information to them in a form that is appropriate, understandable and useful.

Several locations in Ohio have been the site of subsequent meetings for custom sewers. Local planning committees of custom sewers work with Extension home economists to develop program content. Often both technical content and business skills are addressed with speakers from Internal Revenue Service, Small Business Administration, State Attorney General's office, the Ohio Department of Economic Development, and professionals such as accountants, lawyers, and insurance representatives. As a result of the Sewing for Profit program efforts, custom sewers, working with county and area Extension home economists, have organized their own trade or professional organizations. They meet regularly and are considering affiliating with one of three national organizations for individuals involved in custom sewing or home-based businesses. These people look at their work or profession in a new light and are realizing that they are business people contributing to the community, the economy, and most of all to their families.

#### IMPLICATIONS FOR COOPERATIVE EXTENSION

The home business aspect of Extension Home Economics programs is relatively new. Although, as I mentioned earlier, it is not new to Cooperative



Extension. A family farm is a home business. Sewing for Profit as well as other home economics related skills are marketable and offer potential for Cooperative Extension programming. Besides sewing related opportunities in clothing and home furnishings, we can provide some very specific assistance based on home economics learnings in:

baking or food preparation	maid service
bed and breakfast	party planning and arranging
catering	chair seating
day care for elderly	planning and conducting
furniture restoration	tag or yard sales
home day care for children	shopping services
	small home appliance repair

The important aspect about these programs is that they remain subject matter based. This characteristic makes them unique and able to relate directly to the specific needs of the business in question. In home economics we know sewing, clothing, fabrics, home furnishings, food and nutrition, management, child care and equipment as well as family considerations and relationships which are especially important with businesses located in the home. We are not MBA's but we have an organization, U. S. Small Business Administration, who knows business and can contribute their expertise. Small business programs without the subject matter base are no different from those offered by SBA or other local small business workshops available through vocational school or community colleges. We have something unique and should build on that strength not only for Cooperative Extension, but also for those individuals who are trying to increase their family income by effectively using and marketing sewing and other home economics related skills.

Cooperative Extension family life programs also have important input into these programs. A home-based business affects everyone in the home and may create changes in relationships between spouses and children. At times, family members may have to adapt their schedules to those of clients. Differences in role perception and changes in self concept may create difficulties that should be acknowledged and dealt with. On the other hand, a home business may introduce possibilities for personal growth of family members. When the home becomes a place of business also, life skills are learned if only through the interactions created. Whenever possible, children can and should be involved. If they have little jobs, they may feel that they are helping and that they are a part of the business. They also develop a sense of responsibility. We hear so often of the chores done by children growing up on a farm. Today's homes provide fewer opportunities for involvement of youth and for contributions they can make to the family. Responsibilities in a home business, regardless of how insignificant they seem, can provide that vehicle for youth. Home-based businesses can have many benefits for families -- monetary and otherwise.

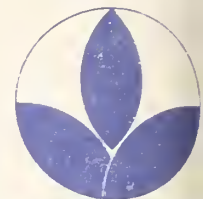
This field has potential for Extension home economics but must be nurtured and identified as a focus if it is to grow. Will it be given the same recognition as agricultural marketing and farm management in terms of resources, notably staff time and money? State specialists and county and area



agents can help organize and program for individuals involved in home economics related home businesses. They can help organize cooperatives or trade groups for networking. Organizations should stand on their own but Cooperative Extension can provide the initial assistance to get started. The opportunities exist if indeed this is a direction to which Extension home economics wants to make a commitment at all levels -- national, state and area or county.

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### Feed Grain Supply Reduced by PIK and Drought

The outlook for feed grains today, compared with the outlook at this time last year, represents the most dramatic turnaround that we have encountered in the history of the National Outlook Conference.

Last year we were looking at record highs in carryin stocks and production of corn. As a result the total supply for 1982/83 far exceeded expected use, and stocks were expected to build to a new high. The farm price of corn last October was depressed to the lowest level in 4 years.

It was in this context that PIK was designed. The acreage reduction program announced in the fall of 1982 and normal growing conditions likely would have continued the burdensome stock situation during the 1983/84 crop year and beyond. The major purpose of PIK was to replace current production with use of some of the accumulated stocks of corn and sorghum and thus reduce the burden on the market of excessive and growing stocks.

PIK was successful in its own right with the greatest participation in a feed grain program on record. If 1983 had been a normal growing year, production would have likely been reduced by a fourth and stocks about a third. But, under the drought conditions that prevailed this summer, the production of corn has actually been reduced almost 50 percent, from the 8.4 billion bushels harvested last year to less than 4.3 billion bushels this year and carryover stocks are expected to be reduced about four-fifths.

A record high carryover stock of 3.1 billion bushels of corn cushioned the impact of this year's PIK and drought-reduced crop on the supply of corn and total feed grains. Almost 188 million metric tons of corn (7.4 billion bushels) are available for the 1983/84 marketing year--about 31 percent less than the 271.4 million tons (10.7 billion bushels) on hand for the year just ended.

An aggregate supply of 49 million metric tons of sorghum, barley, and oats brings the total feed grain supply for 1983/84 up to 237 million--about 25 percent under the record 326.4 million on hand for 1982/83. The combined supply of sorghum, oats, and barley, although 11 percent smaller than the 1982/83 supply, is about equal to the average supply over the 12 years, 1971-1982. The supplies of sorghum and oats are down 23 percent and 9 percent, respectively, from a year earlier. Both had larger carryover stocks which were more than offset by reduced harvests this year. Barley is the only feed grain in greater supply this year. Larger carryover stocks and a small gain

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in this year's crop resulted in an increase of 82 million bushels in barley supply from the year-earlier supply of 683 million bushels.

The feed grain supply has trended upward at an average annual rate of about 3.8 percent per year over the past 12 years. However, the growth in feed grain supply is completely accounted for by rising corn production (largely as a result of an upward trend in yield per acre). The combined supply of sorghum, barley, and oats has fluctuated around an average of 50 million metric tons for the past 18 years. For the 5 years, 1978-1982, corn has comprised about 83 percent of the total feed grain supply. The sharp reduction in corn supply this year has reduced its share of the supply of feed grains to 79 percent.

The feed grain supply may be augmented by increased feeding of wheat this year. A near record supply of wheat is on hand and prices have been somewhat depressed during the harvest season, falling significantly below corn and sorghum prices in many areas. Wheat feeding has been estimated at 350 million bushels for the June 1983-May 1984 wheat crop year. Almost 286 million bushels of wheat were fed during the June-September period, so only about 60 million bushels may be fed in the 1983/84 corn marketing year.

The pattern could be different this year. The amount of wheat fed during the 1983/84 corn marketing year may depend to a large extent on the amount of wheat that goes under loan. A large proportion of the 1983 crop of wheat is eligible for loan and it has been moving under loan. Almost 650 million bushels of 1982 crop wheat were put under loan. Once wheat is placed under loan, it is not likely to become available to the market unless the price of wheat rises above the redemption value (loan plus accrued interest). However, at the redemption value, wheat may have lost its price advantage over other feed grains, except in some feeding areas where wheat is locally available.

#### Feed Grain Use To Decline In 1983/84

Use of feed grains during the 1983/84 crop year 1/ is expected to total 210 million metric tons, about 8 percent under disappearance of 228 million tons during 1982/83. But, this season's use will likely exceed production by a whopping 71 million tons, leaving carryover stocks of 27 million tons next year, the lowest carryover level for feed grains since 1976. This would also represent a record reduction in carryover stocks--a decrease of 72 percent in a single year.

Disappearance of corn is estimated at 172 million tons (almost 6.8 billion bushels), or 82 percent of total feed grain use. Last year, total use of corn amounted to 192 million tons and comprised 84 percent of total feed grain disappearance.

Use of sorghum is expected to reach 18.5 million tons, compared with 18.8 million a year earlier. Barley use is forecast at 11.6 million tons--up 1.6 million from last year; disappearance of oats likely will be close to year-earlier use of 7.9 million tons.

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Livestock and poultry feeding will continue to be the major market for feed grains. Feed and residual use is projected at 125.3 million tons, down 21.5 million tons (15 percent) from a year earlier. Corn use for feeding at 100.3 million tons (almost 4.0 billion bushels) is expected to comprise about 80 percent of the total. Feed and residual use of corn during the 1982/83 marketing year was 4.8 billion bushels. However, it is believed that the disappearance last year included a substantial residual component which is not expected to be repeated this year. This residual component may have amounted to as much as 400 to 500 million bushels. Consequently, the quantity of corn fed to livestock this year may be down only 7 to 8 percent from the quantity actually fed last year. Much of this reduction would have to result from decreased feeding per animal unit, reflecting the lower livestock/feed price ratios this year. The number of grain consuming animal units represented by livestock and poultry numbers for 1983/84 is expected to be down about 1 percent from a year earlier.

The greatest reduction in feeding likely will occur during the last half of the feeding year. Red meat and poultry production for the first half of 1983/84 is forecast at 27.3 billion pounds--3.7 percent larger than meat and poultry production for the corresponding period last year. The last half of 1983/84, red meat and poultry production likely will be down about 4 percent.

Combined feed use of sorghum, barley, and oats likely will about equal the 25 million tons fed in 1982/83. Barley and oat use is expected to be up slightly, offsetting a small decline in the quantity of sorghum fed.

The food, seed, and industrial use (FSI) of grain has been trending upward during the past decade, mainly because of an expanding market for high fructose corn syrup (HFCS). In recent years, development of a market for ethanol as a gasoline additive has also contributed to the growth in use of corn in processing. About 950 million bushels of corn are expected to be used for processing and seed in 1983/84, an increase of 6 percent over the 900 million used last year.

Although world coarse grain production outside the United States is up about 3 percent this year, total world trade is still expected to increase. U.S. exports of coarse grains are expected to rise about 4 percent, thus holding our share of total world trade at 56 percent.

Corn exports are expected to total 47.6 million tons this years (almost 1.9 billion bushels), slightly above last year's exports. Corn will comprise about 86 percent of feed grain exports this year. The balance of exports will include about 6.4 million tons (250 million bushels) of sorghum and 1.5 million tons (70 million bushels) of barley. Exports of sorghum and barley last year were 5.3 million and 1 million tons, respectively.

#### Strong Feed Grain Prices In Prospect For 1983/84

With corn representing 79 percent of the supply, and 82 percent of the use of feed grains, corn prices largely determine the prices for all feed grains.



Historical data reveal a significant relationship between ending stocks of corn, measured as percent of use, and the deflated season average price received by farmers. For 1983/84, total use of corn is forecast at almost 6.8 billion bushels out of an available supply of 7.4 billion bushels. If use reaches the forecast, carryover stocks would be reduced to about 625 million bushels next October, or about 9.2 percent of use. Based solely on the statistical relationship between ending stocks and deflated price, the expected average farm price for 1983/84 could be about \$3.80 a bushel. In light of current prices, this forecast appears too high. Yet, only a small seasonal rise from the current price, would yield an average of \$3.40 for the year. The historical relationship between supply/demand and price does point to a dramatic increase in the season average price. It appears that we may have a significant seasonal price rise as we move into late fall and winter. With corn prices likely to average substantially higher this year, prices for sorghum, barley, and oats, also will average well above year-earlier levels.

#### Feed Grain Supply Expected To Increase For 1984/85

With corn prices likely at a record high level during the first-half of this crop year, farmers probably will approach the 1984 planting season with optimism. With a 10-percent acreage reduction required for compliance with the feed grain program for 1984, even a large sign-up would not idle a substantial amount of corn base. Therefore, if planting and growing conditions are normal next year, we may harvest a corn crop in excess of 8 billion bushels next fall. If the acreage planted report and growing conditions next summer confirm this prospect, corn prices can be expected to drop rapidly next August and September. Even with an increase in corn use as sharp as 10-15 percent, production--with trend yields--would exceed use, pointing towards another increase in stocks. Yields may be the major factor affecting the size of the stock change.

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### Outlook in Brief

This year's coarse grain outlook contrasts sharply with the pattern of recent years when the world was faced with ample feedgrain (coarse grain) supplies, prospects of huge stocks buildups and diminishing trade. World feedgrain production is now estimated to be down nearly 100 million tons (13 percent) with most of the decline occurring in the major exporters. With global feedgrain use expected to rise for the second consecutive year, and the crop off, countries will be forced to dip into stocks. Corn prices will likely remain firm which could limit import demand and stimulate shifts in trade and use to other feedgrains and possibly wheat.

Global feedgrain stocks are expected to drop by an unprecedented 50 percent from last year's record level to the lowest level in 8 years. World stocks as a percent of utilization will consequently fall to about 9.2 percent—the lowest ratio since the mid 1970's when feedgrain use was more than 100 million tons lower than it is now. Without the huge cushion of feedgrain stocks prevalent in recent years, some uncertainty and continued tightness will likely characterize the market throughout the 1983/84 marketing season.

Feedgrain production in the Northern Hemisphere, exclusive of the United States, is estimated to be a record high. Poor crops in Canada and Europe are more than offset by bumper harvests in the Soviet Union, China, and Mexico. However, the very poor feedgrain harvest in the United States (the lowest in more than 15 years) dominates the Northern Hemisphere supply situation because it will necessitate a U.S. feedgrain stocks drawdown to less than one-third of this year's beginning stocks level. Increasing attention, therefore, will be focused on crop prospects in major producers in the Southern Hemisphere. Crops in South Africa, Australia and Brazil are expected to rebound sharply from last year's drought-induced shortfalls, while Argentina is expected to have another good crop comparable to last year.

Global coarse grain trade of about 90 million tons is expected to be only 2 percent higher than the preceeding year and would represent a sharp slow down in the 13 percent average annual growth rate that prevailed during the 1970's. Import demand for feedgrains is expected to be extremely price and credit sensitive, and consequently tight global feedgrain supplies and higher prices, particularly relative to wheat, are likely to delay any significant recovery in world import demand this year. Domestic shortfalls and continuing financial problems could limit import demand in key importing areas such as Eastern Europe, Mexico, Morocco and Egypt.

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On the other hand, import demand could be larger than presently anticipated. Despite a bumper feedgrain harvest, imports by the USSR are expected to decline only slightly from last year in order to meet growing livestock feed requirements. Stronger import demand for feedgrains may also come from the EC because of a poor feedgrain harvest and shifts away from high-priced, imported non-grain feed ingredients. U.S. forward sales activity, particularly for Japan, is 50 percent stronger than at this time last year, and that strength could continue into the year as importing countries' economics recover.

Exportable feedgrain supplies among major foreign exporters will be limited, at least until Southern Hemisphere crops become available in March/April 1984. At least until that time, South Africa will be a net corn importer instead of a major exporter. Virtually all of Argentina's old crop corn and sorghum are reportedly committed as is much of Canada's exportable barley. Short barley harvests in the EC, and important middle eastern producers/exporters will mean sharply lower export supplies available for the Middle East from those traditional suppliers, and the possibility of increased feed wheat import demand.

Last year at this time we were also looking for relatively little change in global coarse grain trade but the Soviets didn't help our forecasting record by taking only half the 23 million tons we had forecast. However, our October 1982 forecasts for non-USSR import demand and competitor exports were actually pretty close: off 1 percent on non-USSR import demand and 15 percent off on competitor exports as a result of drought-impacted harvests in South Africa and Australia. This year our Soviet forecast is probably safer in that: a) it is supported by a new LTA and b) their purchases thus far suggest that its "on track," whereas last year we were simply banking on larger purchases later in the year which never came.

The impending sharp stocks drawdown, reduced foreign export availabilities and rising foreign feed use have stimulated prices to their highest level in several years. Prospects are consequently bright for U.S. feedgrain exports, although the strength of importer demand for the year could depend on sufficient hard currency, the availability of credit and the competitiveness of wheat.

World Coarse Grain Summary  
(Million Metric Tons)

	1979/80	1980/81	1981/82	Estimated 1982/83	Forecast 1983/84
<b>World</b>					
Production	742	731	765	780	681
Utilization	741	741	732	748	758
Ending Stocks	93	82	115	146	70
Stock/Util. (%)	13	11	16	19	9
Trade <u>3/</u>	99	108	98	89	91
<b>United States</b>					
Production	239	198	249	256	140
Utilization	161	147	154	167	156
Exports (Oct/Sept)	71	69	59	53	57
Ending Stocks	53	35	71	107	34
U.S. Stks/World Stks (%)	57	43	62	73	49
<b>Soviet Union</b>					
Production	81	81	72	86	103
Utilization	100	101	98	98	113
Imports	14	24	20	12	11
Stocks Change	--	-2	--	-1	1
<b>Major Foreign Exporters <u>1/</u></b>					
Production	51	67	65	56	61
Utilization	36	36	37	39	38
Exports	19	28	29	24	25
Ending Stocks	7	10	8	9	8
<b>Rest of World</b>					
Production	371	385	379	382	377
Utilizaiton	444	457	443	444	451
Imports	85	84	78	77	80 <u>2/</u>
Exports	9	10	11	12	9
Net Imports	76	74	67	65	71

1/ Argentina, Australia, Canada, South Africa, Thailand.

2/ Includes 2.3 MMT imported by South Africa.

3/ Excludes intra-EC trade.



## Production

World coarse grain production has dropped to its lowest level since 1975. A combination of government programs and adverse weather caused a drop of 115 million tons in U.S. production alone. Global production is presently forecast to fall nearly 100 million tons from last year's record 780 million tons. In contrast, non-U.S. production is up almost 20 million tons (about 3 percent) to 542 million tons on slightly higher yields and a 2 percent expansion in area.

In the Northern Hemisphere, generally favorable weather and good feedgrain crops prevailed outside the United States. The Chinese have had a record harvest and Soviet feedgrain production is the largest since 1978--the second consecutive improvement over the poor 1981 crop. Eastern Europe, however, had another poor crop, and small barley harvests in Canada, the European Community, Turkey and Syria will mean limited exportable supplies.

In the Southern Hemisphere, early indications point to a significant recovery in the South African and Argentine corn crops and Australia's sorghum and barley harvests. Much attention will focus on the crop conditions and harvest prospects in those countries, to see if they will help alleviate the tight supply situation.

## Consumption

Global coarse grain consumption is forecast to reach a record 758 million tons, about 1 percent higher than last year, following 5 years of relatively stagnant use. The increased consumption is a function of better domestic harvests. Larger crops in the USSR and China, where greater availabilities convert directly into increased domestic consumption, more than offset poor crops in Eastern Europe, the European Community and the United States where reduced domestic availabilities and high prices are expected to inhibit consumption.

Coarse grain consumption outside the United States and USSR is up for the first time in 3 years, but strong grain prices may dampen the impact of a recovering world economy. The continued use of non-grain feed ingredients, and hard currency and credit concerns are important prevailing impediments to any sustained growth in coarse grain demand.

## Stocks

Global coarse grain stocks are forecast to drop by 75 million tons in 1983/84--less than half of last year's 146 million tons and the lowest level since 1975/76. At prevailing utilization levels, that stock forecast would represent only 9.2 percent of utilization, which is also the lowest ratio since 1975/76 and compares to last year's high 19.4 percent.

The United States, accounts for most of the decline in world stocks as stocks are forecast to be down by nearly two-thirds or 70 million tons. The United States will still hold about half of global coarse grain stocks, however. Farmer-owned reserve and CCC inventories together could drop from 85 million tons to about 15 million tons. Total U.S. stocks will therefore equal only 64 percent of export volume compared to 2 years ago when total U.S. coarse grain stocks represented 200 percent of export volume.

Total foreign stocks (excluding China, Eastern Europe and the USSR) are forecast to decline about 11 percent in 1983/84. Stocks held by major exporting countries are expected to decline by nearly 20 percent as Canada draws down its barley stocks to meet export commitments in the face of a short crop.

### Trade

. World coarse grain trade at nearly 91 million tons in 1983/84 is expected to increase only marginally as importers react to higher feed grain prices, tight supplies and the increasing competitiveness of wheat. Stronger import demand throughout Europe caused by short domestic crops, and continued demand growth in the less developed countries (LDC's) are expected to more than offset lower import demand currently forecast for the USSR and China. However, world feedgrain trade remains relatively depressed vis-a-vis earlier years.

Successive good feedgrain harvests by the USSR have meant sharply reduced import requirements whereas a shortage of hard currency and credit problems in Eastern European countries have inhibited feedgrain purchases. West European import demand has trended down, although this year's short barley and corn crops in the European Community (EC) will necessitate larger feedgrain imports for feed and industrial use. Among the LDC's, the growth trend continues upward in 1983/84, but only marginally. Little change is expected in import demand patterns for major Far Eastern importing countries like Japan, South Korea or Taiwan. Both Mexico and Brazil continue to be erratic importers as demand remains a function of the size of their domestic harvests. Mexico, with a good harvest, will likely cut coarse grain imports, whereas import demand from Brazil, which has had a poor harvest, could increase 5-fold from a year ago. Continuing focus will be on drought-stricken South Africa, which will not only export a mere 15 percent of last year's reduced export volumes, but will be a net importer of coarse grains (corn) for the first time.

Demand for barley will be particularly strong this year, especially in the EC, the Middle East and North Africa. Importing countries such as Iran, Libya, and Algeria will need alternative sources of supply in the face of reduced export availabilities from the EC, Syria and Turkey. Unusual import demand from the EC and Turkey will also contribute to expanded global import demand for barley. Deteriorating crop conditions in other importing countries suggest prospects for stronger import demand.

The sluggish international economic situation will continue to have some adverse impact on coarse grain import demand. Heavy foreign indebtedness, tight credit and shortages of hard currency continue to be major factors in limited East European import demand. Credit availabilities and terms could influence importing decisions in heavily indebted countries like Morocco, Egypt and Mexico. Price relationships between feedgrains and wheat could also influence the import demand for feedgrains in a number of countries.

On the export side, coarse grain shipments by major foreign exporters will likely increase by about a million tons. However, exportable supplies outside the United States are presently unusually tight, and total foreign export prospects will depend heavily on Southern Hemisphere harvest and export availabilities. Virtually all Canadian barley from a short crop, and old crop Argentine corn and sorghum have already been committed. Barley shortfalls in the EC, Turkey and Syria have sharply lowered export availabilities and turned

the EC and Turkey into major barley importers this year. Thailand's good harvest will support larger exports, but South Africa's drought impacted harvest will not only curtail exports but turn South Africa into a net corn importer.

U.S. coarse grain exports during 1983/84 are expected to increase by about 3.5 million tons to almost 57 million tons amid signs of global economic recovery, strong forward sales of both corn and barley and limited foreign exporter availabilities. Poor harvest among normal exporters of feedgrains--the EC, Canada, Turkey, East Europe, South Africa, and Syria--will not only mean less export competition, but greater import demand for U.S. grain from many of those suppliers. U.S. feedgrain exports are expected to comprise about 63 percent of world feedgrain exports, compared to 60 percent the past few years.

#### Outlook By Major Region

Soviet coarse grain production is estimated at 103 million tons, one of the largest crops on record. Both cattle and hog numbers in the socialized sector are at record levels. Slaughter weights should continue to rise into 1984 as both the quantity and the quality of livestock feed improves. The Soviets may have already covered half of their 1983/84 projected coarse grain import needs of 11 million tons; around 9 million tons are covered by agreements. Relatively high world coarse grain prices and the large 1983 coarse grain harvest are expected to keep import demand in 1983/84 near the levels required by those supply agreements.

Poor corn and barley harvests in the EC amid increasing demand from the mixed feed, brewing and starch industries will ensure strong prices for feedgrains in the Community this year. France is the major producer and exporter of corn within the EC, and the size of its crop and export availability will have a direct impact on third country import demand. With the French corn harvest presently estimated to be down by 15 percent from last year, and high-priced imported soy beans and manioc in short supply, EC import demand for corn could be sharply higher than in 1982/83.

Although the EC is traditionally self-sufficient in barley, a shortfall of about 6 million tons will necessitate malting barley imports and curtail feed barley exports. The Community has already purchased 500,000 tons of malting barley from Australia and Canada. Export authorizations for barley are only half the magnitude of last year's levels, as the commission attempts to counter concerns of inadequate barley supplies by reducing exports. Additional expected wheat feeding could help alleviate the tight EC feedgrain situation.

In the Middle East, barley supplies are tight. Short crops and low stocks in Turkey and Syria will sharply reduce exportable supplies that would normally be available to countries like Iran and Libya. Turkey may have to import more than 500,000 tons to meet domestic needs and fulfill some export commitments. The EC is another major barley supplier to the Middle East which may have only limited exportable supplies for this region that normally imports 2-3 million tons annually.

Brazil is another swing factor in the tight coarse grain supply picture. Instead of exporting corn as it has for the past several years, a poor harvest will necessitate about 700,000 tons of imports this year to help meet domestic



demand and cover some export commitments. Despite the government's efforts and commitment to encourage production, Brazil's position as a net importer or exporter will evidentially still depend on the size of the annual harvest. In East Europe, despite a 7 million ton ( 10 percent) drop in coarse grain production, import demand is expected to recover by less than a million tons from last year's low level. Financial problems continue to inhibit the decisions to import the feedgrains necessary for any expansion of livestock and poultry. Coarse grain imports during 1983/84 are thus expected to be less than half the level of only a few years ago when annual imports averaged nearly 11 million tons.

Total coarse grain exports for major foreign exporting countries--Australia, Argentina, Canada, Thailand and South Africa--are forecast at over 24 million tons, about 1 million tons above 1982/83 levels. Virtually all Argentine old-crop corn and sorghum are reportedly committed, though much old-crop sorghum remains to be shipped. Plantings for the new crop are beginning amid prospects for another 18 million ton outturn similar to last year. Projected Canadian barley exports of 6 million tons are also virtually all committed. However, the export forecast has some upward potential depending upon domestic barley demand and the overall quality of the crop. All Canadian coarse grain sales and shipments, with the exception of corn, presently show considerable increases over last year.

Australian crop prospects continue to improve with projections of a record barley harvest and expectations of near-record coarse grain exports. Thailand is expected to have 500,000 tons more corn to market this season and current sales are beginning to pick up from the recent sluggish pace. South Africa, on the other hand is now expected to maintain higher stock levels from its up-coming crop, thereby reducing export prospects.



Larry Van Meir, Economic Research Service, USDA

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### Feed Grain Supply Reduced by PIK and Drought

The outlook for feed grains today, compared with the outlook at this time last year, represents the most dramatic turnaround that we have encountered in the history of the National Outlook Conference.

Last year we were looking at record highs in carryin stocks and production of corn. As a result the total supply for 1982/83 far exceeded expected use, and stocks were expected to build to a new high. The farm price of corn last October was depressed to the lowest level in 4 years.

It was in this context that PIK was designed. The acreage reduction program announced in the fall of 1982 and normal growing conditions likely would have continued the burdensome stock situation during the 1983/84 crop year and beyond. The major purpose of PIK was to replace current production with use of some of the accumulated stocks of corn and sorghum and thus reduce the burden on the market of excessive and growing stocks.

PIK was successful in its own right with the greatest participation in a feed grain program on record. If 1983 had been a normal growing year, production would have likely been reduced by a fourth and stocks about a third. But, under the drought conditions that prevailed this summer, the production of corn has actually been reduced almost 50 percent, from the 8.4 billion bushels harvested last year to less than 4.3 billion bushels this year and carryover stocks are expected to be reduced about four-fifths.

A record high carryover stock of 3.1 billion bushels of corn cushioned the impact of this year's PIK and drought-reduced crop on the supply of corn and total feed grains. Almost 188 million metric tons of corn (7.4 billion bushels) are available for the 1983/84 marketing year--about 31 percent less than the 271.4 million tons (10.7 billion bushels) on hand for the year just ended.

An aggregate supply of 49 million metric tons of sorghum, barley, and oats brings the total feed grain supply for 1983/84 up to 237 million--about 25 percent under the record 326.4 million on hand for 1982/83. The combined supply of sorghum, oats, and barley, although 11 percent smaller than the 1982/83 supply, is about equal to the average supply over the 12 years, 1971-1982. The supplies of sorghum and oats are down 23 percent and 9 percent, respectively, from a year earlier. Both had larger carryover stocks which were more than offset by reduced harvests this year. Barley is the only feed grain in greater supply this year. Larger carryover stocks and a small gain

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in this year's crop resulted in an increase of 82 million bushels in barley supply from the year-earlier supply of 683 million bushels.

The feed grain supply has trended upward at an average annual rate of about 3.8 percent per year over the past 12 years. However, the growth in feed grain supply is completely accounted for by rising corn production (largely as a result of an upward trend in yield per acre). The combined supply of sorghum, barley, and oats has fluctuated around an average of 50 million metric tons for the past 18 years. For the 5 years, 1978-1982, corn has comprised about 83 percent of the total feed grain supply. The sharp reduction in corn supply this year has reduced its share of the supply of feed grains to 79 percent.

The feed grain supply may be augmented by increased feeding of wheat this year. A near record supply of wheat is on hand and prices have been somewhat depressed during the harvest season, falling significantly below corn and sorghum prices in many areas. Wheat feeding has been estimated at 350 million bushels for the June 1983-May 1984 wheat crop year. Almost 286 million bushels of wheat were fed during the June-September period, so only about 60 million bushels may be fed in the 1983/84 corn marketing year.

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With corn prices likely at a record high level during the first-half of this crop year, farmers probably will approach the 1984 planting season with optimism. With a 10-percent acreage reduction required for compliance with the feed grain program for 1984, even a large sign-up would not idle a substantial amount of corn base. Therefore, if planting and growing conditions are normal next year, we may harvest a corn crop in excess of 8 billion bushels next fall. If the acreage planted report and growing conditions next summer confirm this prospect, corn prices can be expected to drop rapidly next August and September. Even with an increase in corn use as sharp as 10-15 percent, production--with trend yields--would exceed use, pointing towards another increase in stocks. Yields may be the major factor affecting the size of the stock change.



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### Food Grain Outlook

World output of foodgrains--wheat and rice--will likely be up slightly in 1983/84, both in wheat and rice. However, U.S. output will be down sharply in both crops--almost 15 percent in wheat and 30 percent in rice. U.S. farm prices are forecast up for both crops as government programs for both crops and adverse weather in rice areas succeeded in reducing our domestic ending stocks of rice and in keeping wheat stocks from rising. But U.S. export earnings from foodgrains will probably fall as competitive pressures in the face of stagnant world import demand depress U.S. export volumes.

On a global basis wheat and rice both present a sharp contrast to corn this year, with the U.S. corn crop down by about 50 percent and prices up significantly. However, the U.S. does not have as dominant a role in world wheat or rice as in corn. In fact other food grain exporters are carrying excess supplies and can make up for our crop reductions.

### World Wheat Outlook

#### World Crop in 1983/84 To Set New Record

Total wheat output in this marketing year is expected to rise to a record of 484.3 million metric tons, 1 percent above last year. The U.S. crop is forecast to drop over 14 percent or 10.9 million tons, but foreign production is expected to rise by 16 million tons or 4 percent. This follows an 8 percent rise in foreign output in 1982/83. Both competitors and major importers are expected to have production gains again this year. The largest increase this year is expected in the competitors, where area continues to expand and yields are forecast at a record.

Area harvested in our 4 major competitors\* is expected to be almost double that of the U.S. this year, compared with 130 percent of U.S.

\*Major competitors are Canada, Australia, the European Community, and Argentina. Major importers are the USSR, China, Eastern Europe, Japan, Brazil, Egypt, and other North African countries.

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acreage in 1981/82, the peak year for U.S. wheat area. Harvested area is down in the U.S. this year by 23 percent in response to the provisions of the Payment-In-Kind and Area Reduction Programs. In the rest of the world--excluding the U.S. and our major competitors--area will be down slightly. Yields, however, are expected to increase for the world, the U.S., and foreign countries as a group. The largest yield gains will be in the U.S. because of favorable weather and as the most marginal land was taken out of production by program participants.

Crops in our 4 major competitors combined are forecast up 6 million tons due largely to area gains. This 5 percent output gain follows a similar increase last year.

Canada may see its second highest crop of 26.6 million tons as area again expands to a record but yield declines. Thus, our major competitor will likely have a marginal decline in output. The biggest gain will come in Australia which is recovering from the devastating drought. Improved weather will allow harvested area to set a record. Australian area has expanded almost continuously throughout the 1970's and is expected this year to be double the 1970 area. With a yield second only to that of 1978/79 and almost double last year's, production will likely rise by over 10 million tons to a record 19 million. Weather problems in the European Community primarily affected the coarse grains, but French wheat output also fell. Production in the European Community, though down 1 million tons from last year, is forecast at almost 90 percent of the U.S. crop. Their harvested area is expected to set a record after six years of continuous increases. Yield will be just below last year's record level and 67 percent greater than the U.S. yield. Argentine area and yield are both forecast to fall from last year's outstanding levels. Output will likely be the second highest ever and is currently forecast at 11.5 million tons, down 3 million from 1982/83's record.

Major importing countries combined will likely have a small increase in output this year, following a sharp rise last year when the USSR, Eastern Europe and China produced crop increases ranging from 7.5 to 15 percent and a combined total of 19 million tons. This year the Soviet crop may be 1 million tons below last year's poor level. In the last 20 years there have been only 6 crops in the USSR below our estimate of 86 million tons produced in 1982/83. Though Soviet wheat area in 1983/84, at 52 million hectares, is the smallest in three decades, the yield may be the third largest. Chinese wheat output jumped for the second year in a row, with a 10-million-ton gain this year after a 9-million-ton rise last year. Wheat area has fluctuated annually in China with no substantial change over the last 20 years. This year harvested area is forecast to rise but still remain below that of the late 1970's. However, yield increases have been dramatic last year and this year. In Eastern Europe output will be down because of yield declines. Among other importers, both Morocco and Tunisia are expected to have lower crops. India, which has become a wheat market in recent years, will likely have its third record output in a row.

### World Wheat Use Up in 1983/84

Use of wheat is determined by a variety of factors including population growth, income growth, liquidity and balance of payment constraints in importing countries, and price and policy decisions affecting wheat use as animal feed. The U.S. and the Soviet Union account for 30 percent of total wheat use. If these two countries are excluded, wheat use will rise by 5 percent in 1983/84. The increases are especially large in the other major consumers--China, India, and the European Community, which together account for over 36 percent of world consumption. World use of wheat is likely to rise only marginally this year as the decline in feed use in the Soviet Union is offset by the increase in food use in the developing countries and China. World wheat consumption is likely to remain below the production level for the third year in a row.

Global feed use of wheat is expected to fall by 3 million tons, with increases in the U.S. and the EC but a drop of 10 million tons in the USSR. It is expected that Soviet feeding will switch more heavily to coarse grains and protein meals and use of wheat as feed will fall to its lowest level since 1976/77. The policy in the European Community is to encourage domestic feeding of surplus wheat. Feed use of wheat in these 10 countries combined is forecast up 35 percent this year to a record 19.1 million tons due to changes in the relative prices of wheat and other feeds. World use of wheat as feed will likely fall slightly to 17 percent of total wheat consumption in 1983/84.

Global consumption of wheat for food, seeds, and industrial uses is expected to rise by less this year than the 5 percent growth in 1982/83. Per capita food use will likely rise slightly but the distribution will favor the developing countries and China where annual per capita increases continue. Developing countries may see a 4 percent rise in non-feed use with a 1.5 percent increase in per capita consumption. China's growth will be even higher this year. China and India, the two largest wheat users besides the USSR, have each doubled use in the last decade. Among the developing country regions, high income North Africa and the Middle East continues to expand consumption of wheat products.

### World Trade Continues to Lag and U.S. Sales to Fall

Good supplies in some major importing countries and poor economic and financial conditions worldwide have depressed total imports while strong export competition caused U.S. sales to fall in 1982/83. For this marketing year those factors are likely to be repeated and exacerbated by slightly higher wheat prices. World wheat trade (including intra-EC trade) is expected to be 106 million metric tons this marketing year, about last year's level but below 1981/82. Both world trade and U.S. exports are likely to be below trend this year.

The major importers will continue to be the USSR, China, Egypt, and Japan. However, the level of wheat imports this year is likely to fall in each of these markets by a combined total of over 4 million tons. Gains will likely be made in other markets like the European Community, Eastern



Europe and Brazil where imports are expected to rise. However, even these import levels may be below those achieved in 1981/82 and earlier years. Another important market will be India, which is forecast to take 3 million tons again in 1983/84. Large purchases from several exporters have already been made.

For many markets, government decisions determine the level and source of wheat imports. Major determining factors include: domestic crop output and quality; economic variables such as prices, balance of payments situation, and credit availability; and political decisions and long-term agreements. Specific circumstances driving imports of wheat this year include: 1) the Soviet shift to greater use of coarse grain for feed and a better quality domestic wheat crop both reducing their wheat import needs; 2) the excellent crops in China combined with the earlier textile agreement problems; 3) the desire of the Indian Government to rebuild grain stocks after the poor rice crop last year; and 4) a return to more normal quality of wheat output in the EC this year after their higher quality crop in 1982/83, thus requiring greater imports of wheat for blending.

Exports are expected to be the same or higher in 1983/84 (July-June basis) for all major suppliers except the U.S. Last year our major competitors, except Australia, also had increased exports as U.S. sales dropped sharply. Exports of our major competitors combined are likely to be above trend for the fifth year in a row. Competitors are benefiting from world prices supported by the U.S. loan rates and a strong dollar which increases the returns on wheat in their currencies. Canadian shipments, which jumped in 1982/83 as sales of feed quality wheat rose, are likely to rise slightly this year to 21.5 million tons. A large sale was recently made to India, the first in several years. EC exports are likely to remain at 15.5 million tons for the third consecutive year. Their sales to China and the USSR which jumped to 4.8 million tons combined last year--aided by a transportation rebate on sales to China and a good quality EC wheat crop--are likely to decline this year. That drop will likely be made up in a variety of other markets. Sales to Egypt, however, are likely to fall as flour needs are being met largely by the U.S. Argentine exports, which grew by 75 percent in 1982/83 as traders offered \$20 per ton price discounts to move wheat, may rise from last year's 7.5-million-ton level to 8 million in 1983/84. Australian exports should rebound dramatically this year after the drought-reduced 1982/83 crop. At 11.5 million tons, exports this year may be the second highest ever. Their sales to many markets in the Middle East, Asia, and Africa will likely expand. So far, no sales have been made to India but it is likely that Australia will return as a supplier to that market.

U.S. exports will continue to shrink in both absolute volume and in market share this year. Total world demand for wheat exports remains depressed because of good foreign crops and a still-weak world economic and financial situation. U.S. exports are being further hampered by strong foreign export competition, policies of importing countries, and relatively high prices, especially in terms of foreign currencies. U.S. exports are forecast at 38.1 million tons in 1983/84, 3 million tons down from last year and 10 million below the peak 1981/82 level. The decline last year occurred



despite major efforts to compete more aggressively--blended credit sales of \$600 million for wheat and the 1-million-ton-subsidized sale of wheat flour to Egypt in addition to the \$500 million in food aid shipments. We also benefited from the large purchases from India, of which 3.5 million tons were shipped last year. This year our shipments to India, China, and Iraq will likely fall, but they are expected to increase to the Soviet Union, Egypt and Mexico.

Positive factors for U.S. exports are: 1) some improvement in the world economy likely in 1983/84; 2) the new U.S.-USSR long-term grain agreement which raises the minimum wheat import level to 4 million tons; 3) the new textile import agreement with China which may raise our market share; 4) the need for a larger volume of hard wheat imports by the EC; 5) financial constraints in the EC which may limit their ability to finance subsidized wheat exports; and 6) a major shift in the relative wheat:corn price ratio. The last two points bear some elaboration. EC wheat exports have risen rapidly in recent years as subsidies to promote exports have been used to get rid of growing surpluses. The EC export subsidy--called a "restitution"--is the difference between a reference world price and the much higher domestic price. With a large volume of exports the cost to the EC budget to finance wheat exports has increased. In 1982/83 the world export price fell while EC support prices rose so the unit subsidy rose. Even with somewhat higher world wheat prices this year the subsidy costs to the EC remain burdensome and will pressure them to find new ways to raise revenues or to cut agricultural payments. The last point is the shift this year in relative prices of wheat and corn. U.S. farm prices for wheat and corn may be equal this year compared with last year when wheat was priced 33 percent above corn. This may induce a shift in feed rations between grains, though the changes will vary by market.

Negative factors affecting U.S. exports in 1983/84 include: 1) slightly higher prices and a stronger dollar; 2) uncertainty about the level of export credits for wheat this year; 3) large volume of competitor export supplies and the likelihood of continued strong competition; 4) reduced Chinese imports needs. Wheat export prices will likely rise only marginally this year, less than any of our other major export crops. However, the strength of the U.S. dollar will translate that into even higher prices in terms of the currencies of many importing countries. In real terms, that is, adjusted for inflation rates in the U.S. and in major markets, the dollar appreciation against wheat importing currencies has been lower than for other commodities. But, the dollar is forecast to remain strong during 1983/84. The ability to finance exports is important and it is likely that the volume of wheat exports financed by P.L. 480, blended credit, the standard GSM 102 program, or any special sale like the Egyptian one will not match last year's high level. Prices and credit competition will undoubtedly remain strong this year as Australian exports rebound while the other competitors attempt to market at last year's level in a situation of stagnant world demand. Rising wheat imports in developing countries are being offset by declines in the Soviet Union and China. How China allocates its reduced imports this marketing year will affect our exports. The present import forecast of 12 million tons for China in 1983/84 is about covered by current long term grain agreements with various suppliers. It is

likely that China will not meet the 6-million-ton minimum in the U.S. agreement for this calendar year.

#### Global Ending Stocks May Rise But Prices Should Strengthen

Global wheat ending stocks are expected to rise in 1983/84 with U.S. stocks probably at about last year's level. We will still hold about 40 percent of total stocks, and U.S. stocks will again exceed the level of our exports, contrary to the situation during most of the last decade. Stocks are expected to rise in the Soviet Union and in the European Community. Though depressed by the large stocks, wheat prices will be strengthened somewhat by large price increases in other grains, especially corn.

In 1984/85 wheat prices could fall because of a \$.35 reduction in the loan rate to \$3.30 per bushel despite acreage reduction programs. U.S. output may rise with total world area and output also expected to increase. Even with an increase in per capita consumption, world trade and ending stocks may not show much change. Without a major change in U.S. domestic or export programs or unexpected weather or policy changes abroad, the current situation of depressed U.S. exports and high ending stocks will continue to plague the wheat sector in 1984/85. The U.S. share of world wheat production, exports and ending stocks will likely each be marginally higher next year than the forecast for 1983/84, but each will probably be lower than last year.

#### World Rice Outlook

##### Global Production Sets Record

World milled rice production in 1983/84 is forecast at 286 million tons (425 million rough basis), the fourth record crop in a row. Last year's output set a record despite the poor Indian crop which fell by almost 15 percent. The outstanding production in China last year more than offset the Indian decline. This year the reverse is likely to be true. Another global record output is expected as a lower Chinese crop is matched by a better Indian outturn. India's crop may exceed the 1981/82 record while China's crop may be the second best yet. In recent years these two countries combined have accounted for 55 percent of global rice output. Among other exporters production is likely to rise this year in Thailand, Japan, and Pakistan, but to fall somewhat in Burma. Among major producers which also import rice, higher crops are likely in Bangladesh, Brazil, and South Korea while production may fall slightly in Indonesia. Brazil's crop should rebound from last year's decline, but Bangladesh and South Korea will both probably see another year of output increases. U.S. rice production accounts for only 1 percent of world output this year, down from 2 percent in 1981/82. Government programs and adverse weather are responsible for the lower area, yield, and output in the last two years.

Rice use will not likely change much this year as direct human consumption adjusts to output in the larger and poorer producing countries. World use is forecast to exceed production for the fifth straight year causing ending stocks to decline. U.S. ending stocks will also fall, but at

1.1 million tons they remain quite high relative to production. The bulk of all rice is consumed and stored where it is produced--in the developing countries and China. Thus, trade is only a small share of world output and use.

#### World and U.S. Exports Forecast About the Same in 1983/84

Not much change is expected in the level of world or U.S. rice exports this marketing year, but they will remain below the peak levels of the early 1980's. The major factors depressing total import demand last year and this year are good crops in many countries and poor economic and financial conditions in several markets. Large Indonesian import needs this year and the first commercial imports by India since 1976 have provided the only stimulus to a lackluster demand situation. Large supplies have encouraged increased exports from usually small traders like Taiwan and Australia. This calendar year Thai exports are expected to account for 29 percent of world trade compared to 18 percent from the U.S., a change from 1980 and 1981 when U.S. exports equalled or exceeded Thai sales.

U.S. sales continue sluggish as South Korean needs for medium grain rice remain low with better crops there last year and expected again this year and as major markets for our long grain rice respond to much lower Thai prices. Liquidity problems in countries like Nigeria have encouraged them to be more sensitive to price differentials which are currently quite wide between U.S. and Thai grades. While U.S. support rates provide a floor for U.S. export prices, Thai prices fell last year as government tax policies were changed to move surpluses by encouraging export sales. Barring any major U.S. export promotion programs, U.S. exports for 1983/84 are forecast at 2.2 million tons.

In 1984/85 U.S. export volume will likely rise marginally as U.S. prices drop slightly because of a rebound from this year's sharply reduced output. World area, production and use are expected to increase with some room for an expansion in total trade. The U.S. share of world production and exports may return to the 1982/83 level of 2 percent of production and 18 percent of exports, but the U.S. share of ending stocks will likely fall. However, the absolute level of our ending stocks will probably rise from the projected 1983/84 level.

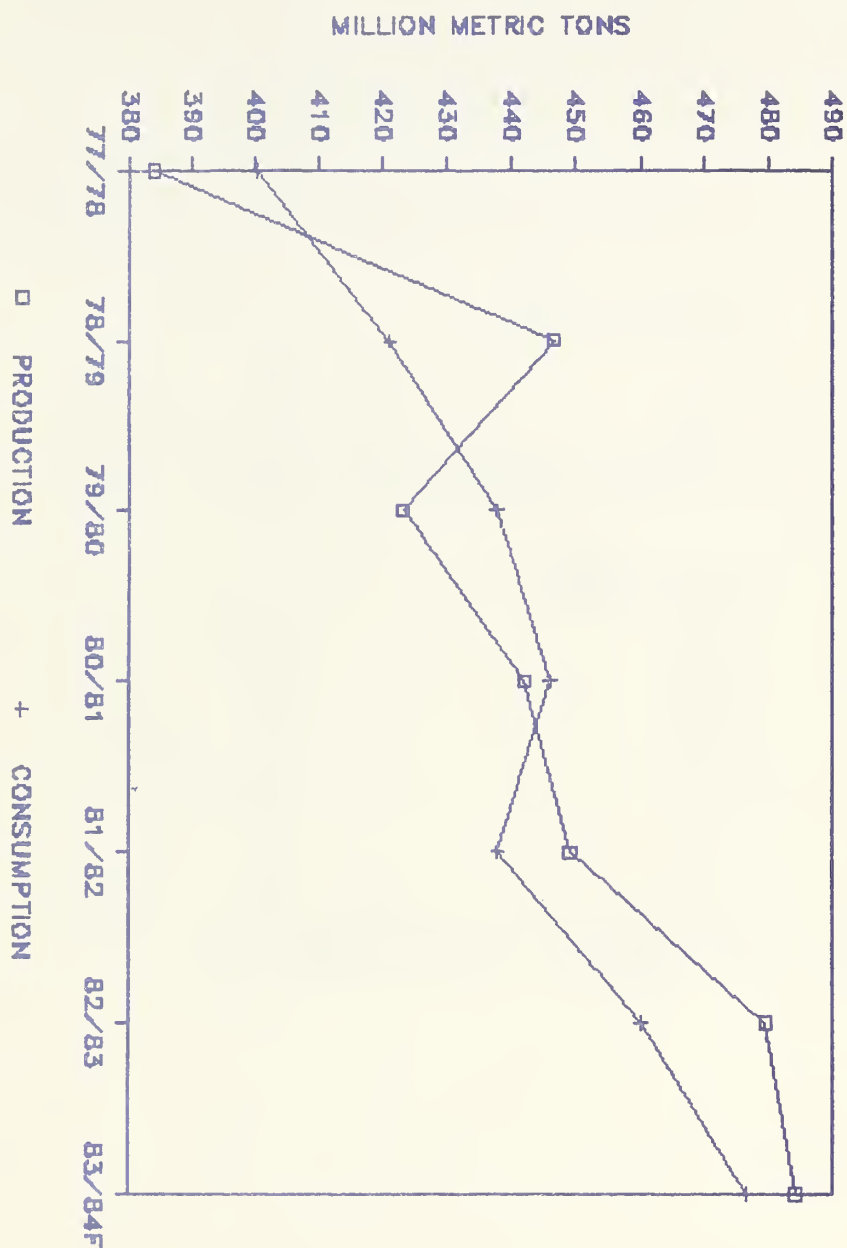
To sum up the situation facing wheat and rice: world supplies of both grains are now and likely will continue next year to be abundant, in contrast to some other commodities; world use of food grains is growing slower than output; trade prospects for all suppliers are stagnant; prices will rise slightly for both grains this year; and, despite U.S. policies designed to reduce supplies, the U.S. is not expected to benefit from increased trade in these grains this year or next.

WORLD WHEAT PRODUCTION

COUNTRY/REGION	1982/83	1983/84F	VOLUME CHANGE
	MILLION TONS		
<u>UNITED STATES</u>	76.4	65.5	-10.9
<u>COMPETITORS</u>	109.7	115.3	5.6
CANADA	26.8	26.6	-0.2
AUSTRALIA	8.8	19.0	10.2
EUROPEAN COMMUNITY	59.6	58.2	-1.4
ARGENTINA	14.5	11.5	-3.0
<u>IMPORTERS</u>			
USSR	86.0	85.0	-1.0
CHINA	68.4	78.0	9.6
INDIA	37.8	42.5	4.7



# WORLD WHEAT



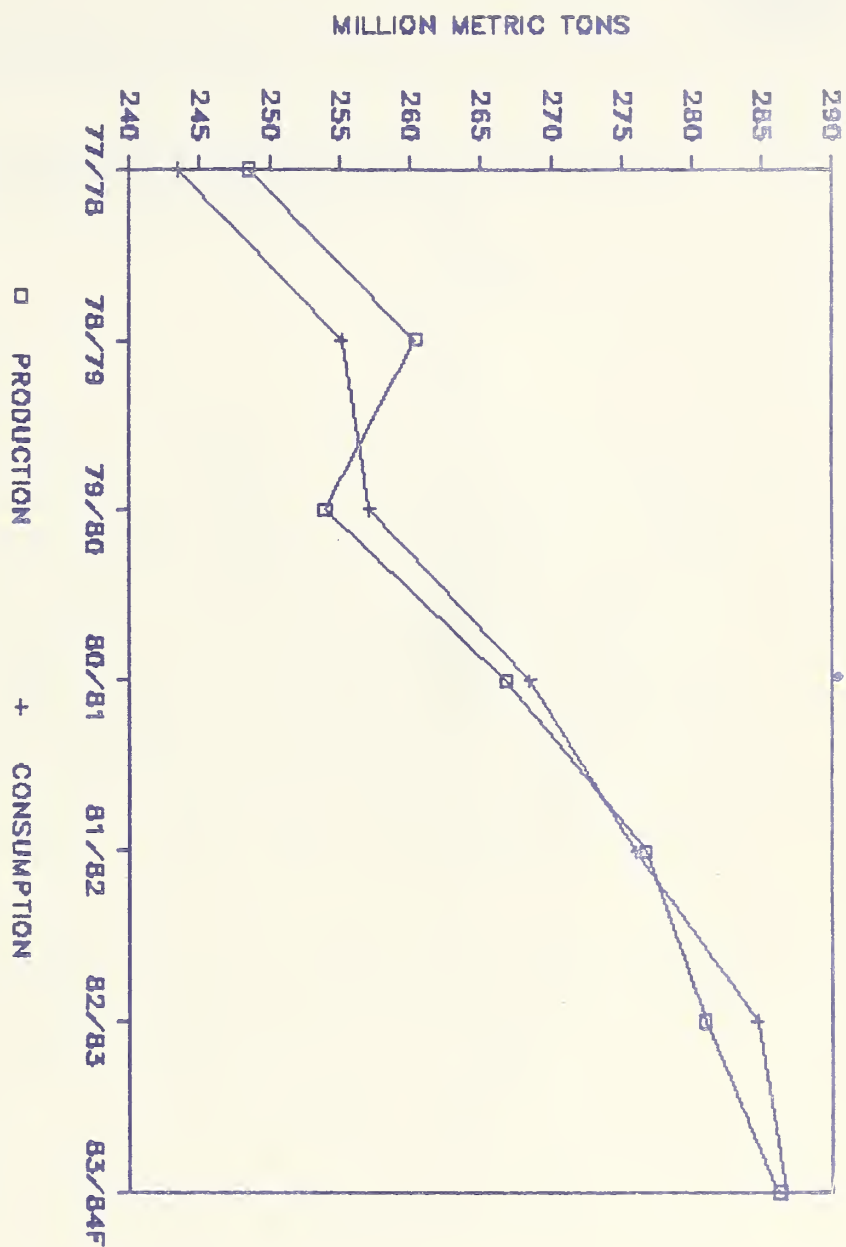
# WORLD WHEAT TRADE

COUNTRY/REGION	1982/83	1983/84F	VOLUME CHANGE
	MILLION TONS		
<u>MAJOR EXPORTERS</u>			
U.S.	40.0	38.1	-1.9
CANADA	21.2	21.5	+0.3
AUSTRALIA, ARGENTINA, EC	31.4	35.0	+3.6
<u>MAJOR IMPORTERS</u>			
USSR	20.2	17.0	-3.2
CHINA	13.0	12.0	-1.0
EGYPT	6.0	5.9	-0.1
JAPAN	5.8	5.5	-0.3
INDIA	3.6	3.0	-0.6

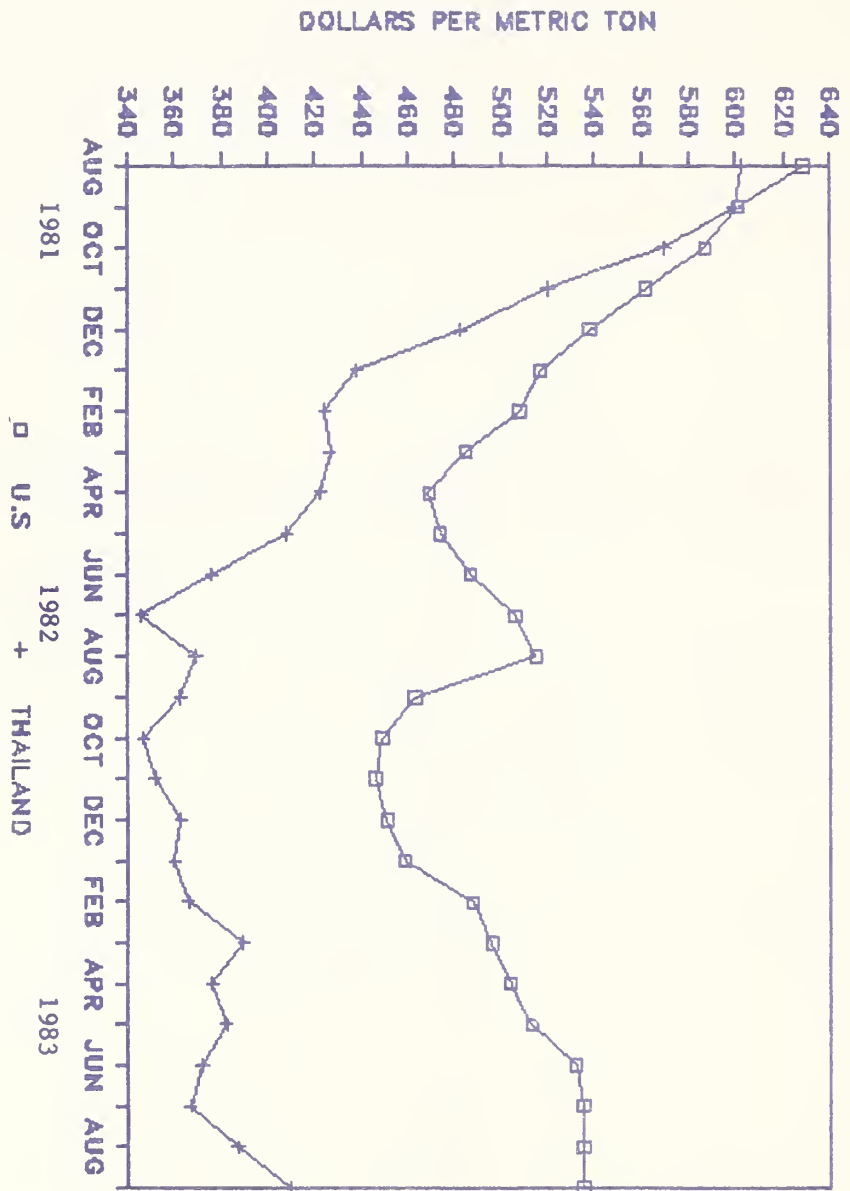
WORLD EXPORTS, JULY-JUNE YEARS

F = FORECAST

# WORLD MILLED RICE



# RICE PRICES





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WHEAT DOMESTIC SITUATION AND OUTLOOK--CONTINUED LARGE SUPPLIES  
FOR HOW LONG?

1983/84 Season Situation

Winter wheat seedings in the fall of 1982 for the 1983-crop were at 62.5 million acres down about 6 percent from the all-time high 1982 acreage. The 1983 winter wheat crop was seeded in nearly ideal conditions and with few exceptions the growing climate remained excellent until maturity. Spring wheat seedings at 14.2 million, down a third from a year earlier, were plagued by persistent wet weather. As the crop was generally planted late, concerns about hot/windy weather at the grain development stage were prevalent and such did occur. Although the winter wheat crop generally enjoyed almost ideal growing conditions, the spring crop experienced the ravages of the 1983 summer drought. Winter wheat yields tallied almost 42 bushels per acre, 16 percent above the previous year, while spring wheat yields declined from the 1982 record yield of 34.2 bushels per acre to 31.4 bushels per acre. The all wheat yield of 39.5 bushels per acre, over a tenth above last year's record, resulted in the third largest wheat crop despite the biggest acreage adjustment program in history.

The 1983 Wheat Program called for a combined 20 percent acreage reduction (15 percent - acreage reduction (ARP) and a 5 percent-cash land diversion (CLD)). It also introduced an optional land diversion program of 10 to 30 percent with payment-in-kind (PIK) compensation equal to 95 percent of a farm payment yield, for a maximum reduction of 50 percent from an established acreage base. A further option under the PIK program was offered to those producers who wished to produce no wheat for 1983 (whole base program). Acceptance of these offers were on a competitive bid basis. Acceptance of the program was much heavier than anticipated and resulted in a significant decline in 1983 production. A summary of production-supply-use-ending stocks-acreage-price is shown on the following table.

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Table 1 - Wheat Supply/Use 1980-83 Crop Years

Item	Crop Years				% Change
	1980/81	1981/82	1982/83	1983/84	From 1982/83
<u>Acreage (Mil.Ac.)</u>					
Harvested	71.0	81.0	78.8	61.0	-22.6
ARP	--	--	5.8	8.9	--
CLD/PIK	--	--	--	3.4/17.5	--
<u>Supply (Mil.Ac.)</u>					
Production	2374	2799	2809	2408	-14.3
Total Supply	3279	3791	3980	3952	- 0.8
<u>Utilization (Mil. Bu.)</u>					
Domestic	776	854	928	1025	+10.5
Exports	1514	1773	1511	1400	- 7.3
Total Use	2290	2627	2439	2425	- 0.6
<u>Ending Stocks (Mil. Bu.)</u>					
Farmer-Owned Reserve (FOR)	989	1164	1541	1527	- 0.9
CCC-Owned	360	562	1061	600	-43.4
	196	187	185	185	--
Farm Prices (\$/bu)	3.91	3.65	3.53	3.50-3.70	--

The following table breaks the U.S. down by regions. Acreage, yield and production data are shown for the 1982 and 1983 crops.

Table 2 - Regional Summary of Acreage-Yield-Production

Region	1982 Crop			1983 Crop		
	: Harvested:			: Harvested:		
	: Acreage	: Yield	: Production	: Acreage	: Yield	: Production
	(Mil.Bu.)	(Bu./Ac.)	(Mil.Bu.)	(Mil.Bu.)	(Bu.Ac.)	(Mil.Bu.)
Pacific NW	5.5	53.7	297.6	5.0	64.5	319.5
Southwest Plains	32.9	31.8	1044.5	25.7	39.0	1001.3
Northern Plains	22.6	32.7	740.8	16.4	30.4	498.9
Southeast	8.8	36.4	318.5	6.1	34.8	212.0
Corn Belt	6.9	40.4	277.9	6.2	46.3	287.2
Southwest	1.6	67.5	105.5	1.1	61.5	65.3
Northeast	.6	40.4	23.7	.6	41.2	23.2
U.S. Total 1/	78.8	35.6	2808.7	61.0	39.5	2407.6

1/ May not add due to rounding.

### Domestic Use - Heavy Feeding

Wheat feeding is expected to top 300 bushels, an increase of nearly 40 percent over last year, for the 1983/84 season reflecting wheat's price attractiveness to competing feed grains (corn and sorghum) whose prices have increased substantially because of the PIK Program and the summer drought. If this feeding level is obtained it will surpass the 1971 level of 262 million by more than 15 percent but less than the 518 million bushels fed in 1943. Some suggest the feeding level may approach 400 million bushels. Corn prices during the July-September period averaged \$3.28 per bushel compared with wheat prices averaging \$3.52 per bushel a ratio of 1/1.1 compared with a historical ratio of 1/1.4. Feeding of soft red winter wheat is expected to be about the same as for 1982/83 at 120 million bushels. However, feeding of hard red winter wheat will likely increase by about three-fold. Feeding of other classes of wheat will be minimal. Domestic food use is expected to increase marginally with seed use up reflecting larger 1984 crop seedings.

### Exports to Decline for Third Successive Year

U.S. exports are estimated at 1.4 billion bushels down about 8 percent from last year and down nearly a fourth from the record 1981/82 level. This decline is a result of a decrease in world trade since 1981/82, increased competition from our major competitors, the strength of the U.S. dollar to other foreign currencies, the aftermath of recent grain embargoes and the economic condition of many importing countries. Significant declines have occurred in the Western Hemisphere countries, China and the USSR. The signing of a new long term agreement with the USSR, and the settling of the textile agreement with China should enhance our chances for a return to past levels of trade with these countries. Although the export pace has lagged during the first few months of this season, the pace has begun to pick up and is expected to meet our projection of 1.4 billion bushels.

### Wheat Prices Relatively Low - Not Much Strength in Sight

Farm prices during the first four months of the 1983/84 marketing year have averaged \$3.52 per bushel, 13 cents under the loan rate but nearly 20 cents above prices a year earlier. Much of the strength in wheat prices this year can be attributed to the substantial increases in corn and soybean prices (corn and soybean prices have risen about 40 percent since January). Wheat prices will likely remain under pressure due to large supplies, stagnant export demand and uncertainty about the 1984 crop outcome. Prices for the 1983/84 season are expected to average \$3.50-\$3.70 per bushel.

### 1983 PIK Program--An Innovative Idea

The 1983 wheat program (20% ARP) was announced on July 14, 1982 and revised on August 27, 1982 (15% ARP/5% CLD). It was designed to reduce supplies and increase the economic position of the wheat sector. However, it became apparent as developments of the 1982 supply/use situation materialized that wheat supplies were going to be much larger than originally anticipated. Important factors contributing to these developments were large global supplies, the worldwide recession, the strong U.S. dollar and the financial plight of major importers. As a result of these developments the PIK Program was announced on January 11, 1983. The objectives of the PIK Program were to:



- Reduce stocks while cutting production, lessening the overhang on the market in future years and enhancing prospects for a market-led recovery in farm prices.
- Maintain supplies in the marketplace, showing the U.S. intends to be a reliable supplier abroad.
- Minimize CCC loan forfeitures by utilizing commodities under outstanding regular loans for PIK compensation.
- To reduce Farmer-Owned Reserve (FOR) stocks to more desirable levels by utilizing these stocks for PIK compensation.
- To promote farm income while at the same time reducing costs to the Federal Government and, thus, to U.S. taxpayers.
- To lessen storage space problems.

The signup for the 1983 wheat (PIK) program began January 24 and concluded March 11, 1983. Enrollment into the program was larger than anticipated and is shown in the following table:

Table 3 Acreage Base Enrollment by Region (Mil. Ac.)

Region	: Total: : Base	: 15% ARP : % CLD Only	: 10-30% : PIK	: Whole Base : Farms	: % of : Total
PNW	6.3	2.8	2.1	.6	88
SP	37.2	14.3	16.2	3.0	90
NP	27.9	8.7	15.9	2.2	96
SE	7.7	2.3	2.0	.8	67
CB	9.3	3.2	1.8	.7	61
SW	1.9	.3	.8	.3	73
NE	.6	.2	.1	--	46
U.S. Total	90.9	31.8	38.9	7.6	86

Final compliance data is not available at this time, however, it is estimated that 75 percent of the total acreage base will comply with the 1983 program. With few exceptions, all PIK enrollments are expected to comply as such contracts are binding with liquidated damages assessed for breach of contract.

Compensation for PIK participants was in-kind equal to 95 percent of the farm program yield. Producers with outstanding loans (regular or reserve) were required to pledge to the PIK a quantity equal to their entitlement. For producers not having outstanding prior year loans, PIK entitlements were distributed from CCC inventories or producers were required to "harvest for PIK". Because of the heavy PIK participation, insufficient quantities of uncommitted CCC inventory were available for PIK distribution. Producers having outstanding loans in excess of their PIK needs were given the opportunity on a competitive bid basis to offer these loans to CCC. Through this process about 223 million bushels of wheat were acquired with the average bid at 14.22 percent. Producers received approximately 35 million bushels back as



compensation. With these acquisitions CCC inventories were still insufficient to meet commitments. On June 8, 1983, Secretary Block exercised CCC's option to require producers with insufficient quantities of wheat pledged as price support loan collateral for PIK to obtain loans on their 1983-crop production--"harvest for PIK". PIK entitlements were made available to southern producers on June 1 and concluded in the northern areas on August 15. The following table shows PIK distributions by region:

Table 4 - Regional PIK Quantity Distribution (Mil. Bu.)

Region	PIK Distribution			
	From		From	Total PIK
	CCC Inventory:	Harvest for PIK:	Producer Loans:	Entitlements
PNW	20	12	24	56
SP	50	59	91	200
NP	24	41	108	173
SE	27	16	2	45
CB	27	13	5	45
SW	17	9	2	28
NE	1	1/	1/	1
U.S. Total	166	150	232	548

1/ Less than 1 million bushels.

#### Farmer-Owned Reserve (FOR) - Size Reduced by PIK Entitlements

Quantities in the FOR topped 1.1 billion bushels in early March but are expected to decline to between 575 to 625 million bushels by June 1, 1984 due to PIK entitlements and maturing FOR contracts. However, the size of the FOR will begin to rise after that date due to entries into the FOR following maturity of 1983-crop regular 9-month loans. It is estimated that 55 to 65 percent of total 1983 loan activity (600-800 million bushels) less "harvest for PIK" quantities (150 million bushels) will be placed into the FOR - between 300-500 million bushels.

#### 1983/84 Carryover Little Change

Carryover stocks on June 1, 1984 at an estimated 1527 million bushels are expected to be little changed from the record level on June 1, 1983 of 1541 million bushels. Although carryover stocks are expected to be about the same, the mix between classes of wheat will change considerably as shown in the following table:

Table 5 - Wheat by Class - Ending Stocks (Mil. Bu.)

Marketing Year/Item	Hard Red Winter	Hard Red Spring	Soft Red Winter	Durum	White	Total
<u>1982/83</u>						
Total Stocks	756	426	74	142	143	1541
FOR Stocks	500	304	29	107	121	1061
CCC Inventory	133	35	10	4	13	195
(CCC Loans)	(12)	(31)	(8)	(11)	(2)	(64)
Free Stocks	123	87	35	31	9	285
<u>1983/84</u>						
Total Stocks	828	334	56	98	211	1527
FOR Stocks	286	187	10	57	60	600
CCC Inventory	119	37	5	15	9	185
(CCC Loans)	(300)	(100)	(40)	(10)	(100)	(550)
Free Stocks	423	110	41	26	142	742

Some tightness in available stocks may occur in hard red spring and soft red winter stocks before the end of the marketing year, if outstanding loan quantities become as large as shown above.

#### Cost and Success of PIK

Much has been written about the cost of PIK and the tremendous rise in the cost of farm programs. Many associate the \$18.0-20.0 billion price tag for FY 83 to PIK. However, with few exceptions, nearly all of this cost is attributed to the 1982 crop programs. More than two thirds of the total outlays were for commodity loans, producer storage payments and interest costs. The cost of PIK and the 1983 farm programs is more reflective of the FY 1984 costs. These costs are expected to be about one-half of the FY-83 outlays. The book value of PIK grain entitlements for the 1983 crops is about \$9 billion. Much of this value can be discounted by potential costs of maintaining such grain for an extended period of time. Generally, it costs CCC nearly 65 cents a bushel per year to maintain one bushel of reserve grain in storage.

The PIK program was very successful for corn, sorghum, cotton and rice in reducing burdensome supplies and improving farm prices for these commodities. The summer drought further reduced supplies, especially for corn and sorghum to relatively low levels. However, for wheat, supplies were only held in check. But had it not been for the PIK program, the 1983/84 carryover may have risen to 2.0 billion bushels. Therefore, the success of the PIK program for wheat has to be measured in what situation it avoided rather than how much supplies were reduced.

## 1984 Program

The 1984 Wheat Program was announced on August 8, 1983. Major provisions are as follows:

SIGNUP PERIOD	Signup for all wheat producers is from January 16 through February 24.
TARGET PRICE	The target price is \$4.45 per bushel.
LOAN RATE	The national average loan rate is \$3.30 per bushel.
1984 ACREAGE BASE	The 1984 acreage base for regular wheat farms will be the average of the acreage planted and considered planted to wheat in 1982 and 1983, and for rotation farms will be the average planted and considered planted and considered planted in the immediately prior two years that correspond to the rotation.
ACREAGE REDUCTION	An acreage reduction (ARP) of 30 percent is required of producers in order to be eligible for loans, purchases and payments for the 1984 crops of wheat.
PIK ACREAGE	Farmers participating in the acreage reduction program may divert an additional 10 to 20 percent of their wheat base and receive payment-in-kind (PIK) equal to 75 percent of the established yield times the acres diverted.
PIK PAYMENT	Producers signing up in the PIK program that have both outstanding reserve and regular loans will agree to use their outstanding reserve loans first and then their regular CCC price support loans. Producers with no outstanding loans agree to harvest for PIK. Those producers with no outstanding loans and who are unable to harvest for PIK will not receive a PIK payment.
ACREAGE DEVOTED TO CONSERVATION USE	The acreage required for the ARP is eligible cropland that equals 42.86 percent of the 1984 wheat planted. If the producer signs up for PIK, wheat acreage is limited to 70 percent of the base minus the PIK acres, and the required conservation use acreage is the PIK acres plus 42.86 percent of the sum of the PIK acres and 1984 wheat planted.

CONSERVATION USE ACREAGE	Land designated for conservation use must have been devoted to row crops or small grains in two of the last three years except for a summer fallow farm. Under summer fallow rules the land must be acreage that would have been planted to small grains or row crops in 1984 in the absence of the 1984 wheat program.
ACREAGE REDUCTION/PIK CONTRACTS	Contracts signed by program participants for either the acreage reduction or PIK program will be considered as binding and will provide for liquidated damages for failure to comply with program requirements.
FARMER-OWNED RESERVE	There will be no immediate entry into the farmer-owned reserve for the 1984 crops of wheat. Further, USDA intends to review the size of the reserve before regular price support loans for the 1984 crops reach maturity. A ceiling may be placed on the size of the wheat reserve at that time which would effectively preclude entry of the 1984 crops into the reserve.
ADVANCE PAYMENTS	No advance deficiency payments are authorized.
LIMITED GRAZING PERMITTED	Conservation use acreage may be grazed except during the six principal growing months. However, haying will not be permitted on the conservation use acreage.
OFFSETTING AND CROSS COMPLIANCE	Offsetting and cross compliance will not apply to the 1984 program.

The above program provisions are subject to change depending on what action the Congress takes on target prices and other program features. Several bills are currently being debated in Congress that would change 1984 program provisions.

Reaction to the announced program has not been favorable and many believe participation will be quite low, possibly as low as 25 percent. However, the economic benefits of the 1984 program should be studied before a decision not to participate is made. The following farm budget comparison of participant versus non-participant may be helpful:



Table 6: Wheat: Farm Budget Comparison -1984 Crop

ITEM	NON-PARTICIPANT			PARTICIPANT			
Harvested Yield (bu/ac)	34	34	35	36	37	38	39
<u>30% ARP Participant</u>							
Net Returns (\$/ac)	47.20	54.56	56.87	59.18	61.49	63.80	66.11
P/NP Difference (\$/ac)	---	+7.36	+9.67	+11.98	+14.29	+16.60	+18.91
Breakeven Price (\$/bu) <u>1/</u>	---	3.60	3.67	3.75	3.83	3.91	4.01
<u>30% ARP/20% PIK Participant</u>							
Net Returns (bu/ac)	47.20	49.72	51.37	53.02	54.67	56.32	57.97
P/NP Difference (\$/ac)	---	+2.52	+4.17	+5.82	+7.47	+9.12	+10.77
Breakeven Price (\$/bu) <u>1/</u>		3.44	3.49	3.54	3.60	3.65	3.71

1/ Market price at which returns for participant and non-participant are approximately equal.

Assumptions:

- Nonparticipant plantings = 1 acre; ARP participant = .7 acre; ARP/PIK participant = .5 acre.
- Farm price = \$3.30 per bushel.
- PIK Value = 10 cents below farm price.
- Deficiency payment = \$1.15 per bushel.
- Program Yield = 34 bushels per acre.
- Variable production costs = \$65.00 per acre; Maintenance of CUA = 30% of variable production costs.

General Rules of Thumb:

1. For each cent decrease in farm price below the \$3.30 loan price, the participant's gain is \$0.34 per acre.
2. If PIK value is equal to farm price, participant's gain is \$0.51 per acre for each yield group.
3. For each \$1.00 change in variable costs of production, the ARP participant's change is \$0.21 per acre. For the ARP/PIK participant the change is \$0.35 per acre.
4. ARP Participant: For each bushel increase in harvested yield above non-participant, the participant's net gain is \$2.31 per acre.
5. ARP/PIK Participant: For each bushel increase in harvested yield above non-participant, the participant's net gain is \$1.65 per acre.
6. For each cent increase in farm prices above the assumed \$3.30 per bushel level, participant returns decline about \$0.25 per acre.

Although participation in the 1984 program will likely be lower than for 1983 it is expected to be above current indications. Little participation in the PIK program is expected as the economic advantage for participation is with the ARP only. However, producers in high production cost and risk areas may find the PIK program to be attractive. Estimates by region of 1984 program participation with comparisons to 1983 are:

Region	1983 Program Compliance	Estimated 1984 Program Compliance
	-----Percent of Total Base-----	
PNW	74-77	45-50
SP	76-78	45-52
NP	85-88	53-59
SE	54-56	25-30
CB	45-48	22-26
SW	68-72	33-38
NE	36-40	17-22
U.S. Total	73-77	46-52

#### 1984-Crop Acreage/Utilization Outlook Acreage and Production Outlook

Fall planting conditions for the 1984-crop winter wheat were not ideal. Topsoil moisture throughout the Southern Plains (hard red winter wheat area) was very short; however, subsoil moisture was generally adequate. That situation has improved considerably for many areas where rainfall has been received in recent weeks. The area of persist dry topsoil is continuing to diminish each passing week. However, much of the hard red winter wheat crop was planted late and stands and growth before dormancy may reduce the yield potential. Planting of soft red winter and white wheat was under gradually favorable moisture conditions.

Early indications of plantings would point to increases over 1983. With the talk of low 1984-crop participation, increased availability of land maintained in conservation uses from the 1983 crops, and the need for early cash flow next spring, plantings for the 1984-crop may be 4 to 8 percent above the 1983 level of 62.5 million acres. Spring wheat plantings with reduced levels of program participation may be 25 to 40 percent higher. This implied level of acreage with program participation of 46-52 percent could result in a production level near the 1982-crop of 2.8 billion bushels. However, weather developments and eventual program participation will weigh heavily on the final outcome.

#### Exports

The 1984 loan level was reduced to \$3.30 per bushel in an effort to signal to the rest of the world that the U.S. will not continue to maintain a high price umbrella, encouraging our competitors to increase their production and further infringe on our world market share. The downward trend in exports over the past two years is expected to turnaround for the 1984/85 season, due to increases in the purchasing power of foreign currencies against the U.S dollar, continued improvements in the world economy, and the lower domestic loan rate (which should make U.S. wheat more competitive in the world market.)

#### Future Outlook

Improvements in production technology, wheat seed varieties and acreage expansion have contributed to the supply problems of the wheat sector today and are likely to persist into the future. How this problem is approached and what increases in demand (both domestic and exports) can be achieved will be a formidable task to accomplish. With the rising costs of farm programs, future legislation must deal with holding the line on federal deficits while still providing appropriate safety nets for the agricultural sector. As new farm program legislative debate will begin in earnest late in 1984 it is important that a dialogue begin now that addresses the vast and complex issues facing agriculture today.

### Rice Program Participation to Reduce Stocks

The total supply of rice this marketing year will be the lowest in 3 years, due primarily to the high rate of participation in the 1983 production-adjustment programs. Approximately 3.9 million acres out of a base of 4.0 million acres were enrolled in the 1983 program, resulting in planted acres estimated at 2.34 million acres and harvested acreage of 2.25 million acres. Although yields might ordinarily increase under such a substantial acreage cut, weather related late plantings, and hurricane Alicia, were the principal weather conditions causing yields to drop to about 46.1 hundredweight per acre. Production is therefore estimated at 102.6 million hundredweight, the lowest level since 1977/78. However, the record level of carryin stocks--71.5 million hundredweight--combined with imports, results in a total supply of 174.7 million, a reduction of about 14 percent from last year.

Participation in the 1983 acreage reduction, paid land diversion, and payment-in-kind programs was high in all production areas. Poor market prices and declining export sales coupled with program benefits prompted rice producers to enroll in the 1983 program at a rate exceeding all other program crops. Enrollment in the 1983 program was as follows:

State	Total Base Acres	Base Enrolled in		Total Enrollment	
		Acreage Reduction	Payment-In-Kind	Acres	Percent
		and Land Diversion Only	(Including ARP and LDP)		of Base
Arkansas	1,557,256	264,685	1,261,401	1,526,086	98.0
California	625,820	36,276	575,065	611,341	97.6
Louisiana	723,516	69,704	634,795	704,499	97.4
Mississippi	364,610	8,292	350,348	358,640	98.3
Missouri	89,618	18,632	66,685	85,317	89.4
Texas	628,254	22,369	589,136	611,505	97.7
U.S. Total <sup>1/</sup>	4,010,438	421,625	3,490,742	3,912,367	97.6

<sup>1/</sup> Includes minor states.

### Exports Prospects for 1983/84 Remain Bearish.

Rice exports are forecast at the same level as last year--69.0 million hundredweight. Prospects for increased exports or an improved export price level were further setback when the government of Thailand further decreased their export premium by 50 percent and also cut their export tax from 5 percent to 2.5 percent during the same week in October. These moves can further increase the price differential between U.S. and Thai rice at a time when a narrowing of the differential is necessary for U.S. rice to be price competitive in world markets. Although world ending stocks of milled rice are expected to decline to less than 15 million tons, the lowest level since 1974/75, U.S. export prospects will likely remain bearish unless the fall Asian crops experience unexpected declines.



### Domestic Use Steadily Increases.

Food and industrial use of rice for 1983/84 is forecast to increase to about 62.0 million hundredweight. This level of use represents about a 4.5 percent per annum trend increase. Domestic use for parboiled and other retail package business, has been the major factor in lifting farm gate prices for some high-quality long grain rough rice above the \$11.00 per hundredweight level in recent weeks. Due to the decline of U.S. export volume, domestic use will be about 90 percent of export use for the year. In the absence of any rebound in export use, domestic market requirements will increasingly affect farm prices.

### Ending Stocks to Decline Sharply.

Ending stocks are estimated to decline to 33.7 million hundredweight, about 20 percent of total use for the year, and nearly 53 percent less than beginning stocks. If the use of rice by type follows previous patterns, the projected ending stocks will likely be only about 7 million cwt. long grain and about 27 million cwt. medium/short grain. This distribution of stocks by type suggests that long grain prices should remain strong and that the Commodity Credit Corporation will likely have medium grain rice delivered under the loan and purchase program.

Farm prices are estimated to range from \$8.50 to \$10.00 per hundredweight, characterized by a wide divergence between medium and long grain prices. The 5-month average price received by farmers will likely be at the lower end of this range unless most sales for the period are for the long grain domestic market or brand-named export use. Currently, the 5-month average price is estimated at about \$8.50/cwt., resulting in a deficiency payment rated of \$2.90/cwt.

### Rice Outlook Workshop.

The 1983 Rice Outlook Workshop will be held starting at 9:00 a.m., December 13, 1983, at the Stoneville Branch Experiment Station, Stoneville, Mississippi.

### 1984-Crop Rice Program.

Any acreage reduction programs for the 1984-crop must be announced no later than January 31, 1984. The loan and purchase level and the target price must be announced no later than March 1, 1984.



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The purpose of my remarks today is to summarize USDA forecasts on the outlook for world oilseeds and products in 1983/84. It seems to me that the biggest story this year in the world of oilseeds is the obvious contrast with the situation that existed only 1 year ago. Consequently, I intend to discuss relatively fewer numbers and show less history than normal. The summary tables I will put on the overhead projector will, for the most part, show only two years of data - 1982/83 and this, the outyear 1983/84.

This time last year, we were looking at an oilseeds outlook characterized by large supplies and weak demand. In the 1982/83 season, the world harvested a record oilseed crop. Prices fell in the face of these large supplies but the consumption response to lower prices was disappointing. Why? Because of weak demand caused primarily by the world recession, balance of payments problems in many key importing and consuming countries, and the strong dollar. We estimate, preliminarily, that despite low prices world consumption of major protein meals grew by less than 2 1/2 percent in 1982/83. Consumption growth of major vegetable and fish oils was somewhat higher - 4 percent.

The contrast with this year obviously has to do with the supply side. U.S. oilseed production is down sharply, offset only in part by the expectation of increased crops outside the U.S. Oilseed carryin stocks in the U.S. are generous. But the demand side still looks weak. Last year, we thought we'd see some turnaround in the world economic situation. Except for the recent upturn in the U.S., that hasn't occurred. We don't see much improvement on the horizon for 1983/84. The strong dollar is still with us and balance of payments problems are, if anything, more serious today than they were a year ago. Our consumption forecasts reflect these factors. But even with our pessimistic consumption forecasts, the picture our numbers draw is that of a tight, and potentially very tight, situation for this season.

I would now like to turn to the tables for a few details.

Table 1. This table shows total world production of major oilseeds and world consumption of major protein meals and oils. We now predict that world oilseed production will fall by 16.4 million tons as compared with last year. All of the decline will be in soybeans, because of the short U.S. crop. Production of oilseeds other than soybeans will be essentially unchanged. Worldwide, we think soybean meal consumption will fall by 5 percent and that consumption of other protein meals will be essentially unchanged. Total protein meal consumption, as soybean meal equivalent, is forecast to decline by 3 million tons or 3 percent.

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In the face of reduced supplies, soybean oil consumption is expected to decline by about 300,000 tons - the first such occurrence of this kind in recent memory. Consumption of palm and other oils will increase to offset this decline. Overall, world consumption of major vegetable and fish oils will decline by slightly less than 1 percent. Since vegetable oils are essential items of direct human consumption, this increase is marginal. This is especially true when we consider that consumption of vegetable oils is extremely low on a nutritional basis in many countries.

To achieve these moderate consumption forecasts, stocks will have to be drawn down sharply. World soybean stocks are expected to fall by 8 million tons. Expressed as months of crush, world carryout stocks of soybeans in 1983/84 will represent less than 1 month's crush - 0.8 months by our calculations. This compares with the more than 2 months of crush estimated to be on hand at the end of the 1982/83 year.

Just to follow up on this point I'd like to show you what the U.S. soybean stock situation looks like. This bar graph shows U.S. ending soybean stocks as a percent of total use (domestic consumption plus exports) - a fairly simple measurement of the supply situation coming out of a marketing year. If our forecasts are right, U.S. carryout stocks at the end of 1983/84 will represent 6.7 percent of this year's total use of soybeans. This would be lower than the 1976/77 season (when the ratio was 7.2), but still above the record low ratios of the early 1970's.

Table 2. This table is similar in form to the first table, except it is about soybeans alone and shows some country detail. As we all know by now, U.S. soybean production is off by almost 19 1/2 million tons. Southern Hemisphere production is forecast to increase by 1.8 million tons. We expect the reduction of world soybean meal consumption to occur in basically 3 places - the U.S. and the EC (because of their price-responsive feed/livestock sectors), and in Eastern Europe (because of the serious economic problems that continue to plague that region). U.S. consumption is forecast to decline by 1.5 million tons, EC consumption by 1.1 million tons and Eastern Europe by about 700,000 tons. We don't expect much change in Japanese meal consumption and Soviet consumption is expected to continue to grow, albeit at a much slower pace than that experienced in the last few years.

The consumption declines on the oil side are spread out among a larger number of countries. None of the changes from last year look dramatic. I'd just point out, however, that the consumption decline forecast for Indian soybean oil - of something just under 100,000 tons - comes on top of an almost 250,000 ton reduction that occurred between 1979/80 and 1982/83. For the most part, the reduction has been offset by increased imports of palm oil.

Table 3 summarizes our forecasts of soybean trade and crush. U.S. soybean exports are forecast to decline by about 5 million tons. Exports out of Brazil, Argentina and Paraguay (on a net basis) are forecast to increase by 1.2 million tons. Almost all of the cutback on the import side is expected to occur in the EC, Spain and Mexico. As touched on in the previous table, higher prices are expected to reduce usage of soybean meal and oil in the European Community which will lower soybean import demand. Consequently, EC soybean imports are forecast to decline by about 900,000 tons. This comes after a 1.4 million ton fall in EC soybean imports in 1982/83. The reduction in Spain is also attributed to price rationing plus a weak livestock sector. Higher domestic oilseed production and a reduced livestock base account for the expected reduction in Mexican soybean imports during 1983/84.

Crush is expected to fall sharply in the U.S. (-3.7 million tons) and the EC (-700,000 tons). European Community crush in 1983/84 is expected to fall to the lowest level since 1976/77. In Brazil and Argentina, where government incentives favor the local crush of soybeans and export of products, crush will continue to increase.

Table 4. This table summarizes the outlook for trade in soybean products during 1983/84. The three importers of soybean meal shown on the table account for three-quarters of world meal imports. We expect East European soybean meal imports to decline by about 500,000 tons in the face of that region's financial difficulties. EC soybean meal imports are also forecast to fall, by approximately 300,000 tons as higher prices ration usage in this important livestock feeding region. As for the USSR, imports of soybean meal are now projected to increase but by an amount much smaller than the 900,000 ton increase estimated for in 1982/83. Better grain, pulse and oilseed crops plus an improved forage picture explain the relatively small increase in USSR imports.

World soybean meal exports are forecast to decline, by about 700,000 tons. U.S. exports will fall by 1.2 million tons while Brazilian and Argentine meal exports will total 10.1 million tons, or 700,000 tons over last year.

The soybean oil importing countries and regions shown on this table account for about 80 percent of world soybean oil trade. We anticipate a large reduction in Indian soybean oil imports, from 450,000 tons in 1982/83 to 325,000 tons in 1983/84. A good Indian peanut harvest and increased palm oil imports explain the reduction. Lower soybean oil imports are also forecast for the USSR (better Soviet oilseed production) and Eastern Europe (financial difficulties). On the export side, U.S. exports are forecast to decline by just over 200,000 tons while Brazilian/Argentine exports will be up approximately 130,000 tons.

Table 5 summarizes the U.S. production and export picture for sunflowerseed, sunflowerseed oil, cottonseed oil, and peanuts.



The reduction in the U.S. sunflowerseed crop is even more dramatic than the soybean crop shortfall - production is estimated to be down by nearly 1 million tons or about 40 percent. Our sunflowerseed exports go primarily to three markets: the EC, Portugal and Mexico. We expect reductions in U.S. exports to all three destinations in 1983/84.

There has been much more variability in the destinations of U.S. sunflowerseed oil exports. In 1982/83, Mexico emerged as a major market, but it remains to be seen whether this will occur again in 1983/84.

The importance of exports to the cottonseed industry is obvious from this table. The U.S. normally exports more than one half of its cottonseed oil production. The bulk of our cottonseed oil exports go to four markets: Venezuela, Egypt, Japan, and the Dominican Republic. U.S. cottonseed oil production and exports will be down sharply in 1983/84.

U.S. peanut production did not escape the effects of this year's drought. Production is off 15 percent from the 1982 level but is still well above the disastrous 1980 crop. Exports are expected to hold up fairly well in 1983/84. We currently forecast peanut exports (shelled basis) at 215,000 tons in 1983/84 against 232,000 tons in 1982/83.

Table 6. Finally, I'd like to leave you with something to think about. Obviously, 1983/84 promises to be an unusual year. The U.S. crop is off sharply and prices are way above the lows they hit just over a year ago. This causes us to think back on, and draw comparisons with, earlier years during which prices rose sharply, even if only temporarily. This table summarizes some key factors or occurrences surrounding three previous years of large price run-ups: 1972/73, 1976/77, and 1980/81. There's a lot of information on this table and I don't intend to walk through each number. I'd just like to make a point or two about the events of previous years.

The 1972/73 year was not one of a short crop. U.S. soybean production was up 8 percent and Brazilian production was not the factor it is today. Carryin soybean stocks were already at a relatively low level and the U.S. and world economies were growing at a good pace which means that demand was strong. This strong demand plus factors exogenous to the soybean sector (USSR grain crop shortfall, poor South American fish catch) drove prices higher. Concerns were raised about running out of supplies and the infamous "soybean embargo" resulted.

1976/77 was a year of a U.S. crop shortfall - production fell by nearly 17 percent from the previous year. But carryin stocks were at high levels. As in 1972/73, the U.S. and world economies were growing and demand was strong. Stocks were drawn down sharply to meet this demand and prices ran up, peaking relatively late in the marketing year.



1980/81 was another year of a U.S. crop shortfall - this time production fell by 21 percent. But the U.S. economy was experiencing only minimal growth and inflation was high. The demand simply wasn't there. Consequently, prices ran up early in the year, but high prices could not be sustained. Consumption fell sharply not only in the U.S. but also in Europe, and the reduction in stocks was relatively small.

What about 1983/84? The size of the crop shortfall is large - larger than in either 1976/77 or 1980/81. But our carryin stocks are at record levels. The U.S. economy is expected to grow by about 5 percent and inflation should remain under control. But still consumption in the U.S. should fall - it always has in the face of high prices. European consumption should fall even more than it has in the past because of the continuing recession and the strong dollar. But to reach even these relatively pessimistic consumption levels, stocks will have to be drawn down sharply. When will prices peak? Or have they already done so? It's not my job to venture a guess. But after looking at this table for some time I'd say that 1983/84 looks a lot more like 1976/77 or 1972/73 than 1980/81.

TABLE 1  
WORLD SUPPLY AND UTILIZATION  
FOR MAJOR OILSEEDS AND PRODUCTS  
(IN MILLION METRIC TONS)

	1982/83 (PRELIM)	1983/84 (FORECAST)
<u>PRODUCTION OF MAJOR OILSEEDS</u>		
SOYBEANS	98.9	77.3
OTHERS	85.3	85.5
TOTAL	184.2	162.8
<u>CONSUMPTION OF MAJOR PROTEIN MEALS</u>		
SOYBEAN	61.0	57.9
OTHER	36.4	36.3
TOTAL	97.4	94.2
TOTAL AS SME	94.0	91.0
<u>CONSUMPTION OF MAJOR OILS</u>		
SOYBEAN	13.4	13.1
PALM	5.8	6.3
OTHER	23.7	23.9
TOTAL	42.9	43.3
<u>STOCKS OF MAJOR OILSEEDS</u>		
SOYBEAN	13.1	5.1
OTHER	3.1	2.3
TOTAL	16.2	7.5
 (EXPRESSED AS MONTHS OF CRUSH)		
SOYBEAN	2.1	0.8
ALL OILSEEDS	1.4	0.6

NOTE: CONSUMPTION ESTIMATES ARE AGGREGATED ON MARKETING YEAR BASIS AND MAY DIFFER FROM SOYBEAN CONSUMPTION ESTIMATES ON TABLE 2 WHERE BRAZIL AND ARGENTINA HAVE BEEN CONVERTED TO AN OCTOBER-SEPTEMBER YEAR.

NOVEMBER 1, 1983

# U.S. SOYBEAN STOCKS: USE RATIO 1969/70 – 1983/84

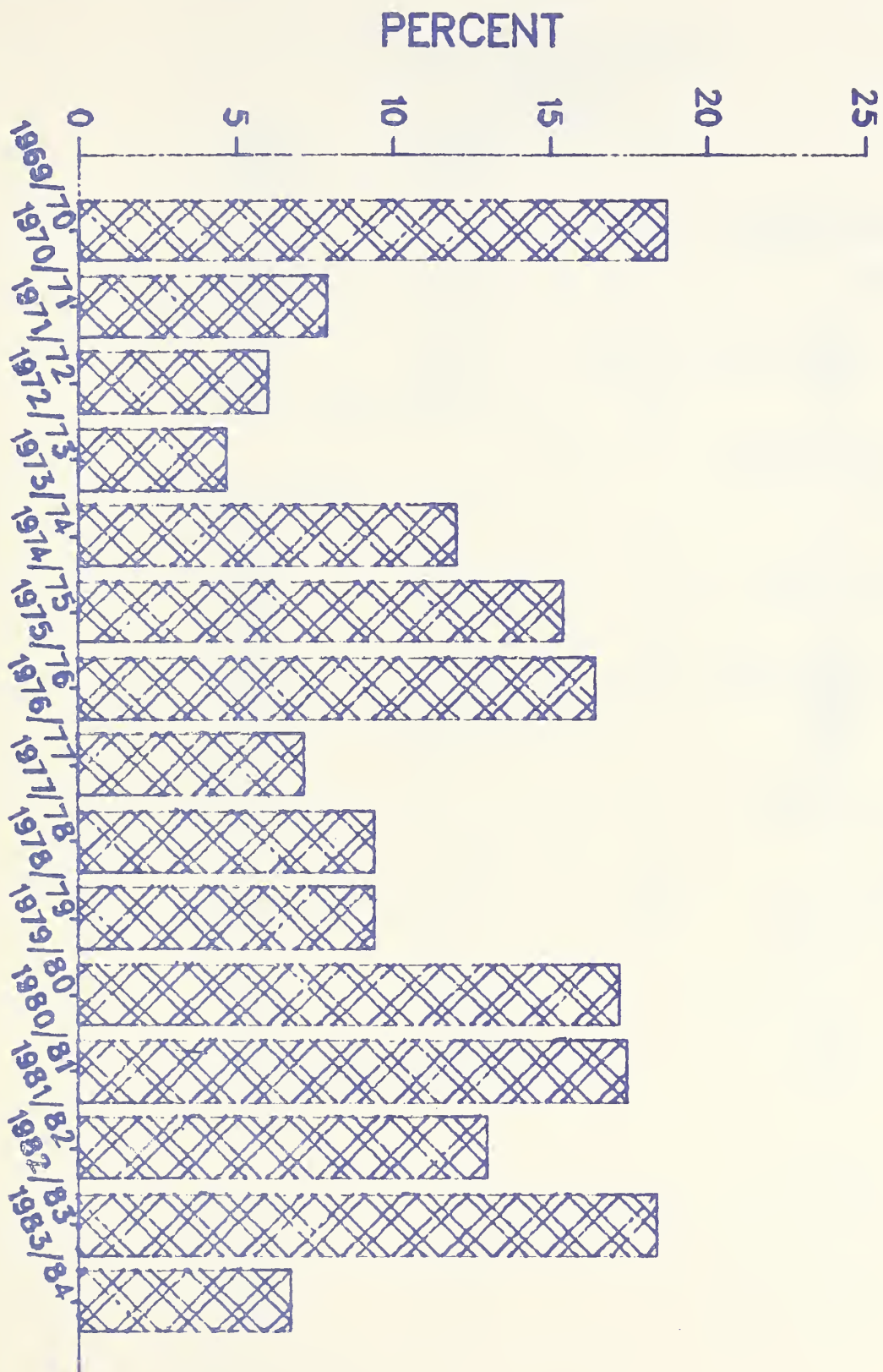


TABLE 2  
WORLD SOYBEAN AND PRODUCT SUPPLY/USE  
(IN MILLION METRIC TONS)

	1982/83 (PRELIM)	1983/84 (FORECAST)
<u>SOYBEAN PRODUCTION</u>		
WORLD	93.9	77.3
U.S.	60.7	41.3
BRAZIL, ARGENTINA, PARAGUAY	18.8	20.6
CHINA	9.0	9.5
<u>MEAL CONSUMPTION</u>		
WORLD	61.0	57.7
U.S.	17.6	16.1
TOTAL FOREIGN	43.4	41.6
EC	15.0	13.9
EASTERN EUROPE	4.1	3.4
JAPAN	3.2	3.1
USSR	3.8	4.1
OTHERS	17.3	17.1
<u>OIL CONSUMPTION</u>		
WORLD	13.4	13.1
U.S.	4.5	4.4
TOTAL FOREIGN	8.9	8.7
EC	1.4	1.3
USSR/EAST EUROPE	0.9	0.8
INDIA	0.5	0.4
PAKISTAN	0.2	0.2
OTHERS	5.9	5.9
<u>U.S. PRICES</u>		
FARM SOYBEANS (\$/BU.)	5.65	8.50-9.50
DECATUR MEAL (\$/ST.)	187	230-250
DECATUR OIL (¢/LB.)	20.5	28-34

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TABLE 3  
SOYBEANS  
TRADE AND CRUSH  
(IN MILLION METRIC TONS)

	1982/83 (PRELIM)	1983/84 (FORECAST)
<u>EXPORTS</u>		
WORLD 1/	28.0	24.2
U.S.	24.6	19.6
BRAZIL, ARGENTINA, PARAGUAY 2/	3.0	4.2
<u>SELECTED IMPORTERS</u>		
EC 2/	10.6	9.7
JAPAN	4.7	4.6
SPAIN	3.1	2.5
TAIWAN	1.3	1.2
USSR	1.3	1.3
MEXICO	1.0	0.5
EAST EUROPE	0.7	0.6
<u>CRUSH</u>		
WORLD	76.9	73.0
U.S.	30.2	26.5
BRAZIL, ARGENTINA	15.0	16.0
EC	10.3	9.6

1/ NET OF EC AND SOUTH AMERICAN INTRA-TRADE.

2/ NET OF INTRA-TRADE.

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TABLE 4  
SOYBEAN PRODUCT TRADE  
SOYBEAN MEAL  
(IN MILLION METRIC TONS)

	1982/83 (PRELIM)	1983/84 (FORECAST)
<u>EXPORTS</u>		
WORLD 1/	18.7	18.0
U.S.	6.4	5.2
BRAZIL, ARGENTINA	9.4	10.1
OTHERS	2.9	2.8
<u>SELECTED IMPORTERS</u>		
EC 1/	8.4	8.1
EAST EUROPE	3.0	2.5
USSR	2.6	2.8

SOYBEAN OIL  
(1,000 MT)

<u>EXPORTS</u>		
WORLD 1/	3,163	2,931
U.S.	862	658
EC 1/	474	384
BRAZIL AND ARGENTINA	1,223	1,355
SPAIN	425	362
<u>SELECTED IMPORTERS</u>		
INDIA	450	325
PAKISTAN	225	225
ME/N. AFRICA	841	850
LATIN AMERICA	593	604
EASTERN EUROPE	275	185
USSR	150	100

1/ EXCLUDING EC INTRA-TRADE.

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TABLE 5

U.S. PRODUCTION AND EXPORTS: SUNFLOWERSEED, SUNFLOWERSEED OIL, COTTONSEED OIL, AND PEANUTS  
(MARKETING YEARS 1980/81 - 1983/84)

	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u> (FORECAST)
<hr/> 1,000 MT <hr/>				
SUNFLOWERSEED (SEPT.-AUG.)				
PRODUCTION	1,697	2,085	2,419	1,438
EXPORTS	1,505	1,555	1,348	950
EC	96	52	52	
PORTUGAL	225	176	272	
MEXICO	272	620	449	
SUNFLOWERSEED OIL (OCT.-SEPT.)				
PRODUCTION	298	137	288	235
EXPORTS	301	108	225	210
EC	62	1	28 *	
VENEZUELA	89	31	30 *	
ALGERIA	80	5	24 *	
EGYPT	43	3	12 *	
USSR	0	41	0 *	
MEXICO	6	1	83 *	
COTTONSEED OIL (OCT.-SEPT.)				
PRODUCTION	542	710	522	349
EXPORTS	322	384	250	163
VENEZUELA	109	91	68 *	
EGYPT	76	156	66 *	
JAPAN	40	41	32 *	
DOMINICAN REPUBLIC	33	27	7 *	
PEANUTS (AUG.-JULY)				
PRODUCTION (IN-SHELL)	1,044	1,806	1,560	1,324
EXPORTS (SHELLED BASIS)	172	196	232	215
EC	101	106	120	
CANADA	31	44	57	
JAPAN	13	16	25	

\* OCTOBER-AUGUST EXPORTS.

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TABLE 6  
U.S. SOYBEAN - HIGH PRICE YEARS  
SIMILARITIES AND CONTRASTS

		<u>1972/73</u>	<u>1976/77</u>	<u>1980/81</u>	<u>1983/84</u> (PROJECTED)
C R O P S	CHANGE IN U.S. CROP FROM PREVIOUS YEAR				
	TONNAGE	+ 2.6 MMT	- 7.1 MMT	-12.9 MMT	-19.4 MMT
	PERCENT	+ 8.1 %	-16.8 %	-21.0 %	-32.0 %
	BRAZILIAN SOYBEAN CROP	N/R	GOOD	GOOD	?
	USSR GRAIN CROP	POOR	GOOD	FAIR	GOOD
S T O C K S	CARRY IN STOCKS/USE RATIO	6 %	16.4 %	17.2 %	18.3 %
	CARRY OUT STOCKS/USE RATIO	4.7 %	7.2 %	17.3 %	6.7 %
	VOLUME DRAWDOWN OF U.S. STOCKS	0.3 MMT	- 3.9 MMT	- 1.1 MMT	- 7.3 MMT
U T I L I Z A T I O N	CHANGE IN SEM CONSUMPTION FROM PREVIOUS YEARS				
	U.S.	- 1.1 MMT	- 1.4 MMT	- 1.5 MMT	- 1.5 MMT
	EC	+ 0.1	N/C	- 0.5 MMT	- 1.1 MMT
	JAPAN	+ 0.1	+ 0.4	N/C	N/C
	CHANGE IN SOYBEAN IMPORTS FROM PREVIOUS YEAR				
	EC	+ 0.6	- 0.1 MMT	- 1.6 MMT	- 1.0
	JAPAN	+ 0.2 MMT	N/C	- 0.2 MMT	- 0.1
	CHANGE IN U.S. SOYBEAN EXPORTS FROM PREVIOUS YEAR	+ 1.7	+ 0.2 MMT	- 4.1 MMT	- 5.0 MMTZ
E C O N O M I C	CHANGE IN U.S. GNP (CONSTANT 1972 DOLLARS)	5.8 %	5.5 %	1.9 %	5 %
	U.S. INFLATION RATE (CPI)	6.3 %	6.5 %	10.4 %	5 %
P R I C E S	CHANGE IN SOYBEAN SAP FROM PREVIOUS YEAR				
	\$/BU.	+\$1.34	+\$1.89	+\$1.29	+ 3.35
	PERCENT	+ 44 %	+ 38 %	+ 21 %	+ 59 %
P R I C E P E A K	MONTH OCCURRED	JUNE '73	MAY '77	NOV. '80	?
	AVG. PRICE (MONTHLY) \$/BU.	\$10.00	\$9.24	\$ 8.18	?



Roger Hoskin, Economic Research Service, USDA

1984 Agricultural Outlook Conference, Session #9  
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The U.S. soybean market has demonstrated its proven volatility by an almost classic turn-about from slump a year ago to boom this year. Hot, dry weather during the summer growing season coupled with a smaller planted acreage has turned a market that last year was awash in product into an apparent desert. Since 1973, U.S. soybean yields have exhibited a volatility not seen up to that point and which some now believe should be regarded as "characteristic" (figure 1). Perhaps greater fluctuations in national weather patterns and expansion of soybean production into areas with more variable rainfall and weather are the basis of this belief. At any rate, yield variability has driven estimated 1983 soybean production down to 1.52 billion bushels, representing the largest year-over-year percentage decline since 1936.

The effect of reduced supplies on price is illustrated in the next slide (figure 2). Plotted are the average of the quarterly prices for 2 previous drought years, 1974 and 1980, and the average of the quarterly prices for 1972-1982 (excluding the drought years). Ordinarily, prices are lowest during and immediately after harvest and then rise to a peak in the quarter preceding harvest. In the drought years, 1974 and 1980, prices were highest during the first quarter of the crop year and declined during the marketing year. The falling prices were due to effective rationing of demand, and by spring and summer, to anticipation of a new, larger crop next season. The short-crop scenario appears appropriate for 1983/84. High prices will reduce use in line with lower supplies--the crush is forecast at 975 million bushels and exports at 720 million, declines of 12 and 20 percent, respectively. Stock holding should be minimal, resulting in low ending stocks of 120 million bushels next August. The price pattern will depend on how tightly farmers hold their 1983 harvest, the pace of exports and livestock slaughter, the corn price pattern and importantly, 1984 production prospects.

Total soybean meal use is projected at 23.5 million short tons in 1983/84. At 17.8 million tons, domestic use would be down 9 percent from last season. Exports are forecast in the 5.7-million-ton range.

The decline in domestic use is based on an anticipated drop in livestock production that will probably become more apparent by next spring. In mid-October, barrow and gilt prices in Omaha were about \$44 a cwt down from \$46 in mid-September and \$58 a year earlier. The hog/corn price ratio stood at 12.8 by mid-October, indicating an incentive to liquidate. The ratio was

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probably even lower at farms, particularly outside the Corn Belt. The prospect of increased slaughter this fall could force hog prices and the ratio still lower, causing further liquidation. The situation is much the same for cattle, although steer prices have not declined as much as hog prices. Rising feed prices have put cattle feeders under a profit squeeze as well. The steer/corn price ratio stood at 17.5 in mid-October, off only slightly from 18 in mid-September but well below 26.5 registered in mid-October 1982.

The impact of falling livestock profitability on domestic disappearance of soybean meal is illustrated in figure 3, which compares quarterly domestic meal disappearance to quarterly hog slaughter. High soybean meal disappearance corresponds roughly to periods of high hog slaughter. Meal disappearance, and consequently meal prices, should be highest during the first two quarters of 1983/84, and then decline as lower hog production reduces meal demand.

Soybean meal prices for 1983/84 are forecast between \$230 and \$250 a ton, a sharp increase over the \$187 averaged for 1982/83. Historically, domestic meal use has averaged between 14 and 16 percent of corn fed. The relationship between soybean meal disappearance as a percentage of corn feed use and the meal/corn price ratio is illustrated in figure 4. As expected, high meal/corn price ratios are associated with low meal-to-corn use and vice-versa. For 1983/84, the price ratio on a ton for ton basis is expected to be a relatively low 1.9 and meal use a relatively high 15.5 percent of corn feed use. This situation suggests increased use of mixed feeds, which include byproduct ingredients. Corn gluten and animal byproducts could see greater use.

Domestic soybean oil consumption is forecast at 9.75 billion pounds, off only slightly from 9.85 billion in 1982/83. Domestic oil consumption is relatively unresponsive to price changes and strongly related to the per capita gross national product (GNP). Consequently, with GNP expected to strengthen this season the greatest adjustment of lowered oil production in 1983/84 will come in exports and stocks. Exports are forecast to decline a quarter to 1.5 billion pounds, and stocks are projected to fall by nearly half to 795 million pounds.

Economic recovery could pressure users to find substitutes for relatively scarce soybean oil. Furthermore, cottonseed oil and sunflowerseed oil is in short supply; prices have risen sharply from a year ago. In 1980/81, when soybean oil production declined, palm oil sold at a discount to soybean oil for 3 months, a reversal of normal circumstances. As a result, palm oil imports increased sharply and remained high until spring 1981 (figure 5). Such a situation could be repeated in 1983/84.

Strong production year is expected for corn oil this season. A boost in high fructose corn syrup (HFCS) use by beverage producers has given millers the incentive to bid corn into industrial use. The result is that corn oil production is expected to rise about 5 percent to 1.02 billion pounds in 1983/84. Palm oil and corn oil could help relieve some of the tightness in the oils market.

Current forecasts of soybean supply and use indicate that 1983/84 soybean oil carryover stocks will be around 6.7 percent of total use. This ratio is low, but not unprecedented. The soybean stocks-to-use ratio fell almost that low as recently as 1976/77, and in the 1950's and 1960's, stocks were frequently as low as 5 percent of use. Although the soybean industry is a more mature industry today, its capability to operate at low stock levels has been demonstrated.

Corn prices have an important influence on soybean prices. For a given soybean stocks-to-use ratio, soybean prices are positively related to corn prices--a higher corn price means a higher soybean price. Figure 6 illustrates a statistically estimated version of this relationship. For each level of expected corn prices, there is an inverse relationship between the stocks-to-use ratio and soybean price. The season average price for corn is forecast between \$3.40 and \$3.80 a bushel. Given this forecast and the projected stock-to-use ratio, soybean price would be expected to be between \$8.85 and \$9.35 a bushel, in line with the USDA forecast of \$8.50 to \$9.50. The highly nonlinear relationship between the stocks-use-ratio and prices suggests prices will be highly sensitive to changes in the ratio. A decline in corn prices or a large 1984 crop could drop soybean prices to the lower end of the range.

Figure 7 depicts the relationship between the ratio of soybean acreage to corn acreage (bottom frame) and the soybean/corn price ratio (top frame). In the years when the average soybean/corn price during March-May was above 2.5, soybean acreage rose relative to corn acreage. However, 1983 planting season represents an anomaly because of PIK. Soybean prices were low relative to corn, and both soybean and corn acreage together declined more than 20 million acres, with corn acreage declining by a greater percentage than soybean acreage.

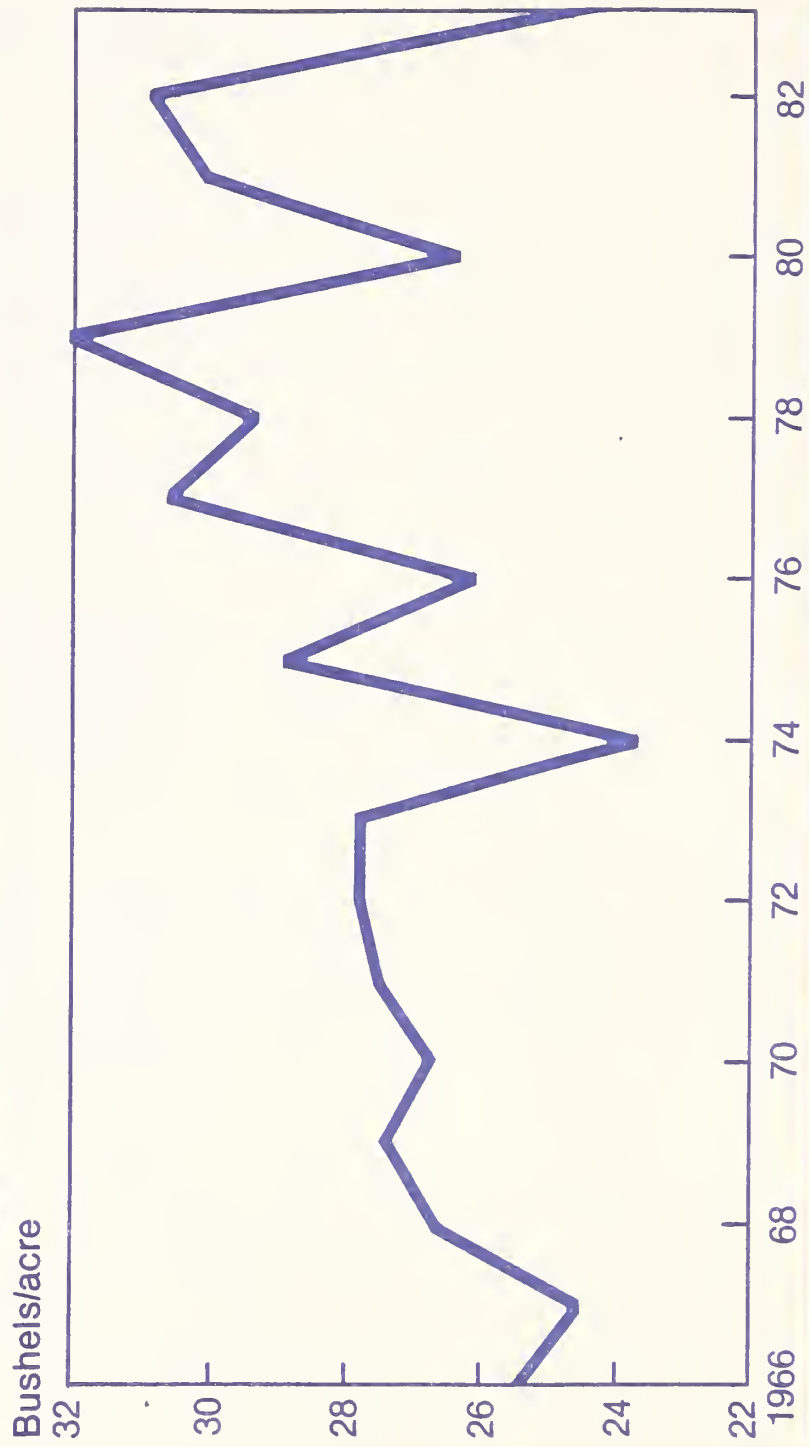
The 1984 corn program--a 10-percent acreage reduction--does not appear as attractive as the 1983 program. Thus, the proportion of soybean-to-corn acreage will depend heavily on relative prices at planting time. Present soybean and corn prices suggest a ratio above 2.5 which will slightly favor soybeans. The amount of conservation acreage that returns to corn production will likely exceed the acreage returned to soybeans. If the ratio of soybean to corn acreage returns to 1982 levels, about 5 to 7 million additional soybean acres could be planted in the Corn Belt.

In the southeast where soybeans are double-cropped with wheat, the 1984 wheat program is unlikely to hold much acreage out of production, particularly given expected soybean prices. Double-cropped acreage could recover by 2 to 3 million. Although forecasts at this point are tenuous, U.S. soybean acreage could range between 70 and 73 million acres in 1984. If planted acreage reaches this level and yields are at or near trend, 1984 production could exceed 2.2 billion bushels. Production in the 2 billion range would certainly push down prices probably as early as next summer.

The cottonseed and sunflowerseed situations are much like that for soybeans, reduced acreage and disappointing yields for both crops. Cottonseed production is estimated at 3.04 million tons and sunflowerseed at 1.5 million metric tons. Prices for the products of these crops will be much higher in 1983/84, but it is the fundamentals in the soybean market that will motivate much of the change.

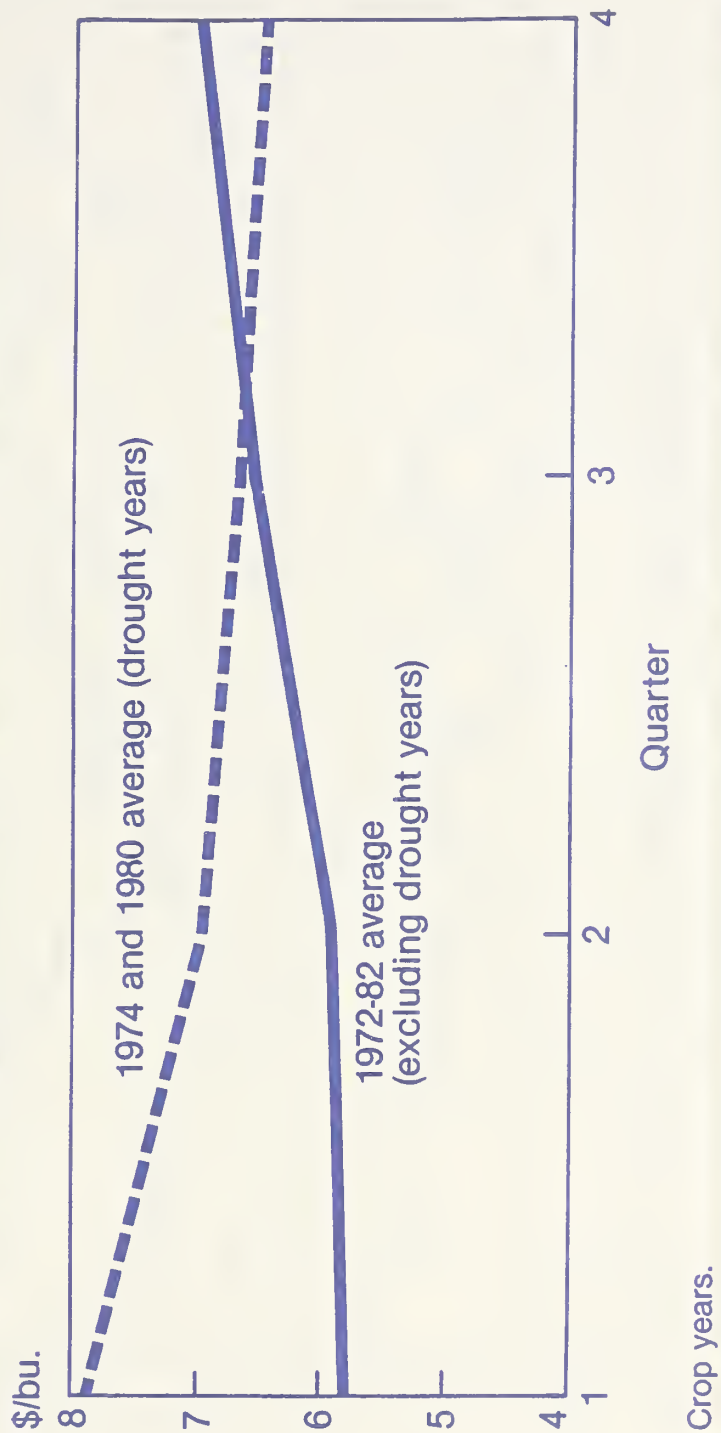


## U.S. Soybean Yields

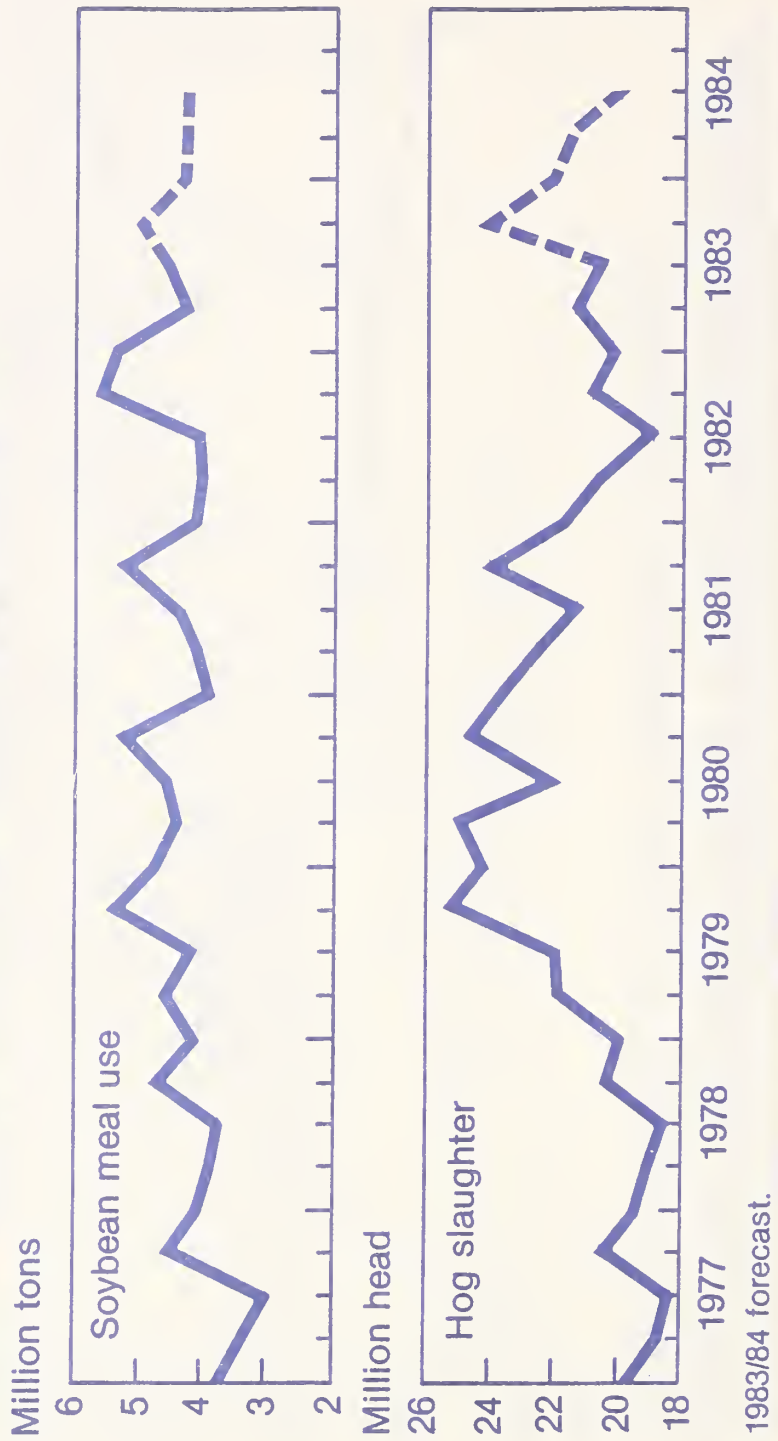




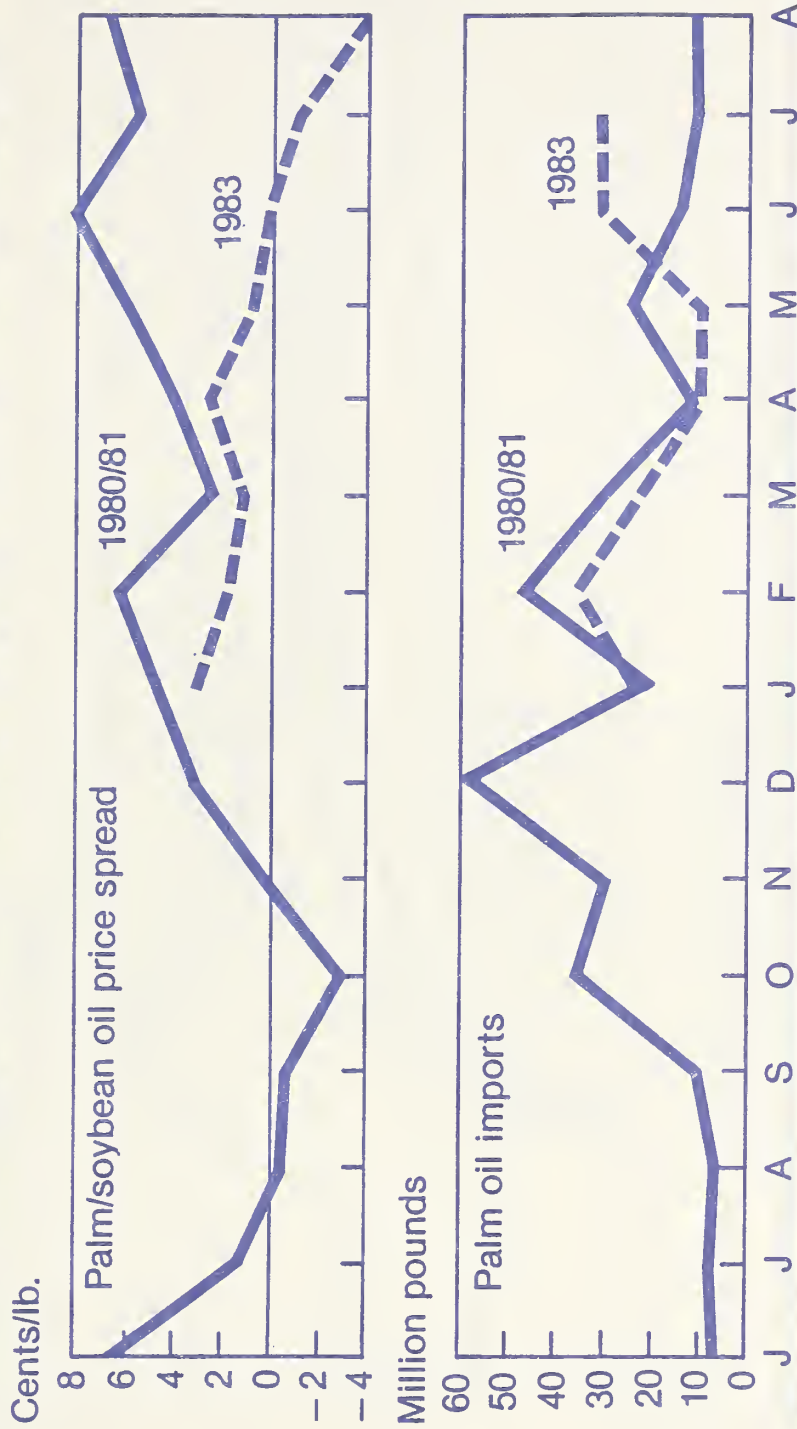
## Seasonal Soybean Prices During Drought Years Contrast With Normal Seasonal Averages



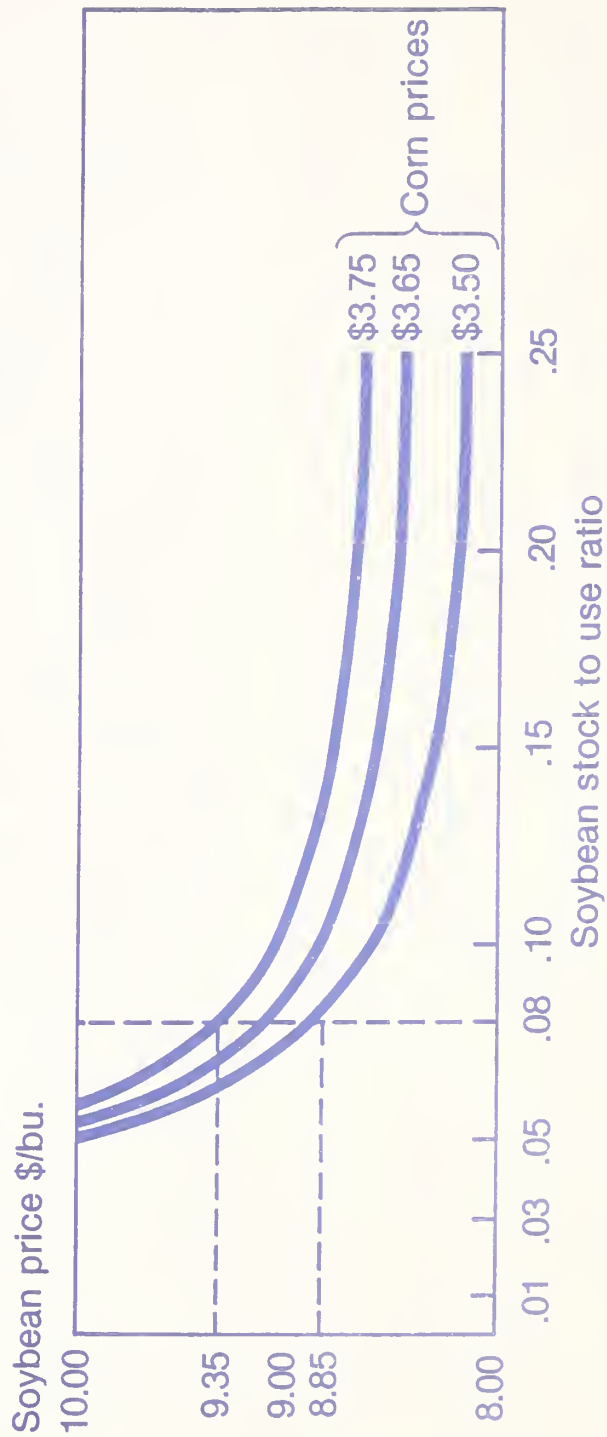
## Soybean Meal Use and Hog Slaughter



# High Soybean Oil Prices Invite Palm Oil Imports



## Soybean Prices Vary With Corn Prices and Soybean Stock/Use Ratio

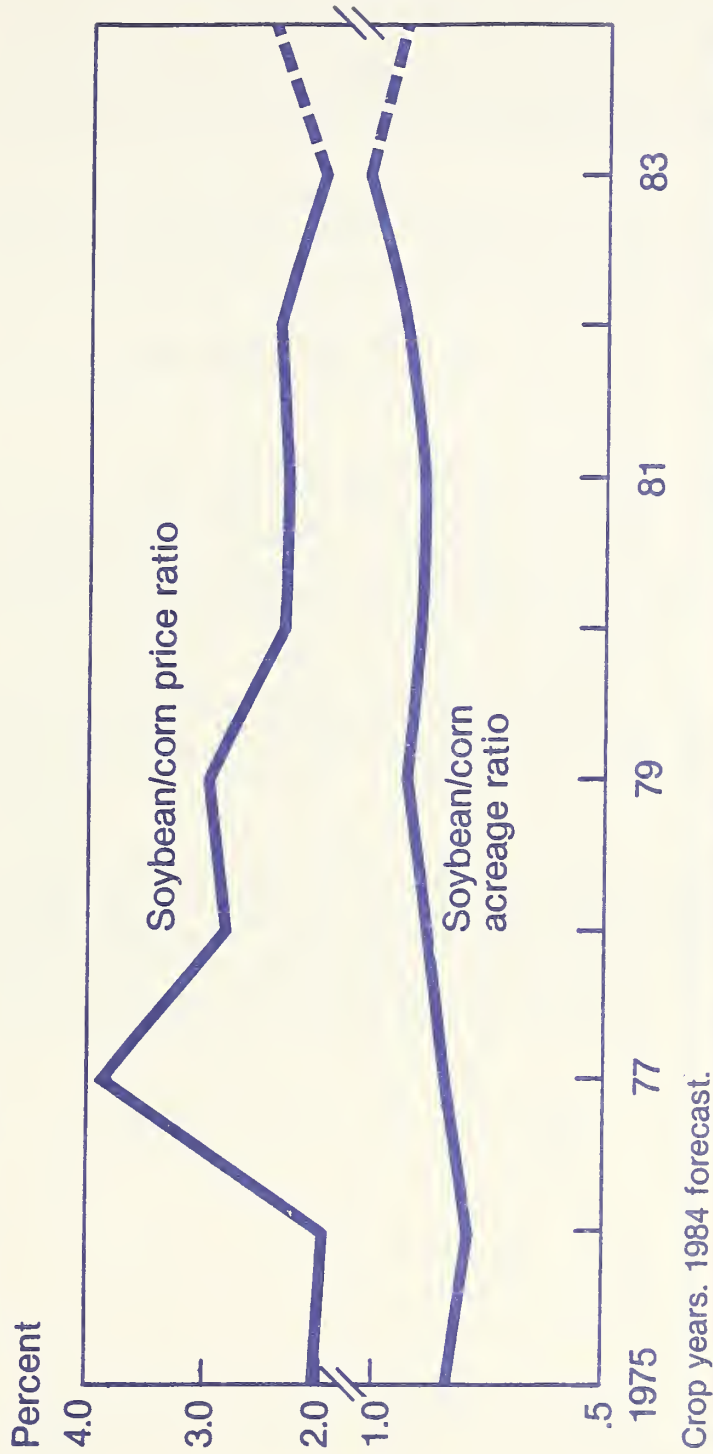


$$P_{\text{soy}} = .99 + 2.02 P_{\text{corn}} + .005 \left( \frac{\text{use}}{\text{stocks}} \right)^2$$

$R^2 = .95$ , S.E. reg = .31, DW = 3.4



## PIK Interrupts Historical Soybean/Corn Relationships



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Thank you for the opportunity to be on the Outlook Program. I have the assignment to discuss two papers which were not available prior to this conference. The choices seem to be:

- 1) Spontaneous reaction to the papers presented;
- 2) Give my own outlook;
- 3) Review what I expect the USDA Outlook to be.

Perhaps I can blend all three. One reason for asking an Extension person is to get a state and/or regional view. Another is to present some management suggestions. With the volatility of the soybean futures, this paper may be \$2 out of date when presented.

The Midwest has experienced the worst dry spell in 50 years. Yes, I said dry spell, not drouth. While the difference in definition may be subtle or technical, the former infers that our problem was one of only reduced rainfall - which has a much higher probability of being corrected in 1984 than a true drouth.

Climatologists can not agree on the cause of our dry spell. The most likely explanation is a massive ridge of high pressure that blocked the southward movement of the circumpolar vortex - that mass of cold air that moves back and forth across the latitudes of the Cornbelt and brings our summer rains. Combined with above average temperatures at critical periods of plant development (pollination for corn and setting and filling of pods for soybeans) - yields fell sharply.

Farmers have not lost their sense of humor. Stories abound, i.e.:

- 1) We have a 3 H weather report - Hot, Humid, and Hazy.
- 2) New interpretation of weather reports - A 30% chance of showers means we don't get any.
- 3) Showers are very scattered -

A farmer leaned his double-barreled shotgun against his pickup. A shower passed over - one barrel was full of water - the other one empty.

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- 4) A farmer tried double crop soybeans after wheat in 1974, 1980 and 1983.

He achieved a yield of 25 bu/A --- 10, 8 and 7 bu/A.

- 5) The soybean yield was lower than the moisture content.
- 6) Farmers quit cutting weeds in the soybean field when prices reach \$9.00 - 15¢/lb for weed seed is a pretty good sale.
- 7) The dry weather caused large cracks to form in the soil.

The cracks became so large that you became worried about what happened to the family dog when he was not on the back porch in the morning.

- 8) A farmer sent his son to the field with the combine and said, "Don't come back until the grain tank is full of soybeans." At last report, the son hadn't been heard from in 3 days.

Yes, we did have over 50 days when the temperature was above 90° throughout much of the Soybean Belt. Rainfall was very scarce from June through September. All 92 counties of Indiana have been declared a disaster area.

Soybeans have often been called the Miracle Crop. It's a miracle that soybean yields are not lower.

#### FARMERS ARE BULLISH

Soybean and corn prices have been a major topic at all the small coffee shop gatherings this summer and fall. Fueled by some bullish articles - the highest price objective I heard was \$21. In view of the price break in September, perhaps they now are thinking of 2 bushels for \$21.

Farmer selling diminishes when the price declines. This causes:

- 1) Premium bases for immediate shipment;
- 2) An inversion in the various futures options.

#### PRICES ARE VOLATILE

After rising over \$3 during July and August, the September crop report confirmed the damage done to corn and soybeans by the hot, dry weather. This brought out a new round of speculators -- on the long side -- and soybean futures prices dropped over \$1.40 per bushel.

What happened? -- I'm not sure anyone can fully explain daily price fluctuations in the futures markets. Psychology of the buyers and sellers is an important factor. First, one must believe the futures markets is the best example of supply and demand in action. Prices rise when there are a large number of anxious buyers and fall when there are a large number of anxious sellers. Next, we must account for the impact of technical analysis

and computer assisted trading systems. Finally, the whip impact of stop orders and buying and selling decisions to alleviate margin calls accentuate price movements.

On September 13th, soybean prices were bid up the limit after a bullish USDA Crop Report. Large commission house selling during the last few minutes of trading was a factor in causing the prices to close down the limit.

For the Technical Analyst, this caused a bearish key reversal to form - a reliable signal that the market had topped out - at least temporarily. Heavy selling followed -- setting off stop loss selling and margin calls. Somewhere, the lower prices triggered sell orders on the computer trend following systems -- and lower prices followed.

The technical analyst looks for a 38% or a 50% correction of the major price movement..

After several days of lower prices, the relative strength index indicated (and traders believe) the market was oversold -- and they bought. For the past 6 weeks soybean prices have traded mostly in a \$1.40 range -- roughly from \$8.20 - \$9.60 November futures, with short term prices on both sides of this range.

The USDA papers are likely to stress:

- 1) World shortage of vegetable oils and their inelastic demand;
- 2) Good crushing margins;
- 3) Need to curtail soybean demand;
- 4) Increased soybean acreage (and production) in 1984;
- 5) Prospects for 1984 S. American soybean production;

And, I will add:

- 6) Technical considerations;
- 7) Merchandising implications.

#### HAVE SOYBEAN PRICES TOPPED OUT?

That's probably the most asked question at this conference. Farmers are bullish and are holding. There are always analysts on both sides of the market, but several have turned bearish since the September price break. If the USDA U. S. average farm price is correct, prices must go higher.

I believe the fundamental supply-demand situation as outlined by the previous speakers, farmer holding, and bullish speculative psychology will give soybeans another opportunity to challenge the November highs. If the prices surpass the September highs, the next technical price objectives are the \$10.77 price level reached in 1977, and the record price of \$12.90 reached in 1973.



Will it happen? With the need to ration soybean utilization, don't rule out the possibility of higher prices. Let the charts (and/or other technical indicators) tell you the price trend rather than try to pick a top.

#### MARKET OBSERVATIONS

1) The technical factors and fundamental factors (as we currently know them) do not agree. The supply-demand balance sheets indicate that usage must be cut by 16%. The futures markets are acting as if the rationing has already taken place. Technical factors can influence a market short term, but eventually the fundamental factors will determine the price trends.

2) Weekly export inspections and crush statistics indicate that soybean usage has not been sufficiently reduced.

3) No two years are the same. Many analysts are trying to say that 1983-84 is identical to 1980-81. And by now, everyone knows a short crop has a long tail. If price analysis were that simple, all analysts could be experts.

4) If the futures market does make a substantial price rise, it is not likely to occur without additional corrections.

5) In a bull market, the nearby options rise the most. This provides an opportunity to forward price (hedge) soybeans in the old crop options and later roll the hedge forward into November 1984 or other 1985 futures contracts.

A NOTE OF CAUTION - Producers who hedge in the old crop futures should not hedge until the market has peaked and monitor the market closely. If additional bullish conditions develop, cancel the short position in old crop soybean futures.

6) After the market peaks and/or farmers sell more readily, the basis will widen. A current basis bid in Indiana for April delivery is 10 cents under the May option. With \$8.50 soybeans and 12% interest, the monthly holding costs for interest is  $8\frac{1}{2}$  cents, or  $42\frac{1}{2}$  cents for 5 months. Add the Indiana personal property tax and a producer needs a 50 cent price rise (or a change in basis if hedging) to cover the holding costs of storing soybeans until April. This does not include an allowance for storage costs.

In view of this, a basis contract would appear appropriate or the producer could sell soybeans and buy futures if bullish. If not bullish, the soybeans should be sold.

7) Producers need to develop a marketing plan to sell their 1983 crop and forward price 1984 production.

8) The soybean market is likely to remain volatile until 1984 production is more certain. This means that news about the Brazilian crop will be important and soybeans must bid land away from corn and cotton for the 1984 crop.

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Washington, D.C.

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While economic conditions have improved dramatically over a year ago, large meat supplies particularly in second-half 1983 are holding down meat price gains. Red meat and poultry output has risen to record levels due to expansion plans made in 1982 and early 1983. This year's drought and acreage reduction programs resulted in higher grain prices and forced production costs to rise sharply. These high grain prices combined with deteriorating forage conditions during the summer have caused producers to market animals that typically would have been held longer, increasing near term meat supplies. Herd reductions will result in lower meat supplies by mid-1984.

#### FACTORS AFFECTING THE RED MEATS INDUSTRY

##### The Economy

The economy continues to show signs of recovery. Real Gross National Product (GNP) is expected to continue to grow strongly for the remainder of the year, compared with a 1 percent decline last fall. In 1984, real GNP is expected to grow 4- to 6-percent. The quarterly growth pattern will show faster growth in the first half of the year, and more moderate growth in the second half. Real disposable per capita income is expected to rise 2 percent this year and about 3 percent in 1984. Real disposable income fell slightly in 1982. This year, the unemployment rate is expected to average nearly 10 percent, but may drop to about 9 percent in 1984. Rising real disposable incomes and reduced meat supplies should strengthen meat prices in 1984 and as a result boost live-animal prices.

##### Feeding Costs Rise Sharply

A moderate inflation level this year has been favorable for livestock producers. Prices paid by farmers for non-farm originated items rose only about 2 percent this year, but are expected to rise 5 to 6 percent next year as the general inflation rate rises, which typically happens during a recovery. Livestock producers should expect a slight rise in interest rates, but they are not expected to rise as sharply as in the past, perhaps about a percentage point. The rate of general inflation may also be a percentage point higher in 1984 than in 1983.

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The combined effect of drought and acreage reduction programs has reduced this year's expected corn crop to 4.26 billion bushels, 49 percent below last year's record. With use likely to be off only 8 percent, the carryover would be around 819 million bushels, less than a quarter of the record 1982/83 carryin. This drop in use reflects lower domestic feed use by livestock producers because of higher prices.

The expected stocks-to-use ratio is now projected at 12 percent, well below 1982/83's extraordinary high of 47 percent, but still exceeds the 1973-75 average of 7.5 percent. The sharp reduction in the stocks-to-use ratio suggests a potential for wide price fluctuation. As a result, prices for 1983/84 are projected to average \$3.40 to \$3.80 per bushel, compared with \$2.65 in 1982/83. Sorghum grain production is forecast at 482 million bushels, down 43 percent from last year. Sorghum prices are expected to average \$3.10 to \$3.40 per bushel in 1983/84, compared with \$2.53 in 1982/83. Grain prices are expected to strengthen this fall and winter and remain relatively firm through spring.

Soybean production is forecast at 1.52 billion bushels, 32 percent below last year. If realized, this would be the smallest crop since 1976. Soybean meal prices at Decatur are projected to average \$230 to \$250 per short ton in 1983/84, compared with \$187 in 1982/83.

Forage supplies may be tight for the existing livestock inventory, with some areas experiencing spot shortages. However, the degree of tightness will depend on the growth of forages from rains in early fall and the severity of the winter. As of October 1, pasture and range conditions were 66 percent of normal for the 48 contiguous States--15 points below last year's very favorable conditions. Most of the area east of the Rockies was suffering from drought. Some areas have received rain, but in many areas, the rain was too late to generate additional fall pasture growth. In a number of States hard hit by drought additional forage will be available from crops too poor to harvest for grain. Hay production is forecast at 143 million tons, down 6 percent from the record 1982 crop, but still the third largest crop over the last decade. While the hay crop was relatively large, hay stocks have already been pulled down by unusually early supplemental feeding this summer and fall.

Hog production costs have increased sharply in 1983, with the largest increases occurring this summer. Feed costs for hogs marketed this fall have increased about \$5 per cwt of gain from \$26 per cwt last year. For those that buy feeder pigs for finishing, the price of feeder pigs has dropped over \$30 per head more than offsetting the rise in feed costs. The lower feeder pig prices, though, have severely squeezed feeder pig producers since their feed costs have been up sharply. Cost of production for all hog producers may continue high until next summer, as the 1984 corn and soybean crop prospects become better known.

Similarly, cattle feeding costs for marketings this fall have risen about \$5 per cwt of gain since fall 1982. Partially offsetting the increased feed costs for cattle feeders have been lower feeder cattle prices and lower interest rates. Production costs may decline, especially in the



second half of 1984, if large corn plantings occur this spring and crop prospects are good.

Costs of producing feeder cattle have been held down by the moderation in the general inflation rate. However, tighter forage and grain supplies have increased feeding costs sharply, while resulting in much lower feeder cattle prices. The tighter forage supplies are encouraging producers to cull their herds earlier to stretch available forage supplies and hold down supplemental feeding costs.

## HOGS

### Some Hog Herd Contraction Expected

Feeding margins have been negative every month this year except for February, and prospects are for negative margins for the remainder of the year. Because of negative feeding margins and prospects for continued high feed costs and weak hog prices, producers have indicated they plan to have fewer sows farrow in 1984. In the September Hogs and Pigs report, producers indicated that they intend to have 4 percent more sows farrow in September-November than a year earlier. In June, producers had indicated intentions to have 8 percent more sows farrow during this period. Also, producers indicated that they intended to have 1 percent fewer sows farrow in December 1983-February 1984 than a year ago.

Actual farrowings may vary from reported intentions due to unexpected economic and environmental conditions. Producers began liquidating the herd this summer, as evidenced by the sharp rise in sow slaughter. This liquidation would have to continue at a high rate this fall to reduce the breeding herd enough to have farrowings significantly below intended levels. The report on the December 1 breeding hog inventory will be released on December 22.

### Pork Production Continues To Rise

Commercial pork production in the fourth quarter of this year is forecast to total 4,125 million pounds, up 13 percent from a year earlier. Fall hog slaughter is drawn from the inventory of market hogs weighing 60 to 179 pounds on September 1, and that category was up 13 percent from a year earlier. Hog slaughter for the quarter is expected to rise about 15 percent from a year earlier as the breeding herd liquidation is expected to continue into the fall. The average dressed weight is expected to be 1 to 3 pounds below last year's relatively heavy 175 pounds because of the much higher feed costs. Commercial pork production for 1983 is projected at about 15 billion pounds, up 6 percent from a year earlier, but down 5 percent from 2 years ago.

Commercial pork production in first-quarter 1984 is forecast to total 3,750 million pounds, up 8 percent from last winter. Hog slaughter in the first quarter is drawn from the inventory of September 1 market hogs weighing under 60 pounds. This figure was up 9 percent from a year earlier,



which suggests that commercial hog slaughter should be projected slightly higher than the 8 percent increase currently forecast.

The lower slaughter number was forecast because of mild weather during fall 1982 and winter 1983, which caused some hogs to be marketed earlier because of increased rates of gain. In addition, the liquidation of the breeding herd should be ended. Projected higher feed prices should cause producers to feed to slightly lighter weights, and the average dressed weight is expected to decline.

Hog slaughter in second-quarter 1984 will be largely drawn from the September-November pig crop. If producers follow their September 1 intentions and pigs per litter are about the same as last year, the pig crop would be up 4 percent. However, if fall 1984 hog futures are trading in the low to mid \$50's and indications are that a large corn crop will be planted, there would be an incentive to retain gilts to farrow next fall. Because of continuing high feed prices, the average dressed weight is expected to decline from last year's 174 pounds. So, commercial production is projected to be about 3,750 million pounds, up 1 percent from a year earlier.

Commercial pork production in the second half of 1984 may be 6 to 8 percent below a year earlier. Second-half hog slaughter will come primarily from the December 1983-May 1984 pig crop. Producers indicated, in September that they would have 1 percent fewer sows farrow in December 1983-February 1984 than a year earlier. The first intentions for March-May will be in the Hogs and Pigs report due to be released December 22.

The December 1983-May 1984 pig crop may be down 5 to 7 percent from a year earlier. The size of the spring pig crop will be influenced by the level of corn prices. If corn prices are in the upper part of the projected range (\$3.40 to \$3.80), producers will liquidate the herd much more sharply than currently expected. However, if prices are at the bottom of the range, producers may cut sow marketings and retain gilts earlier than expected. Total commercial pork production for 1984 may be around 14,700 million pounds, down 2 percent from 1983 but 4 percent above 1982.

#### CATTLE

The inventory of cattle and calves on January 1, 1984 is expected to show a continual but modest decline. The base for future beef production continues to be eroded. On July 1, the number of beef cows in the inventory was 1 percent below a year earlier, despite favorable forage conditions. Cow slaughter this summer was 6 percent larger than a year ago, when forage conditions were much more favorable. Slaughter is likely to remain near the large levels of a year ago this fall. In addition, on July 1, 1983 the number of beef heifers being retained for possible herd expansion declined 5 percent from a year earlier to the lowest level since 1979. This is the second consecutive year of decline and indicates that the recent trend of modest declines in cattle numbers is likely to continue in 1984.

Cattle numbers at the beginning of 1984 are likely to be unchanged to down slightly from the 115.2 million head recorded at the beginning of this year. Forage supplies were very favorable through midsummer. However, this

summer's drought sharply curtailed grazing conditions in the Plains States and areas east. Rains since mid-September will help forage conditions in most winter grazing areas, but the rains were too late to provide much help in the typical spring and summer grazing areas. Most of the High Plains and Kansas wheat grazing areas finally received rains in mid-October; however, grazing conditions in this area this fall remain uncertain and are likely to have a low grazing capacity for stocker cattle. Although some areas have been extremely dry, overall forage supplies should be tight but adequate unless the winter is unusually severe.

A reduced breeding herd base, and an expected fourth consecutive year of modest declines in the size of the calf crop in 1984 is likely to result in little change in the cattle inventory during 1984. A return to more normal forage conditions and stronger cattle prices next spring through second-half 1984 is likely to result in a sharp decline in nonfed slaughter. Expectations of a large crop acreage in 1984 and substantially lower grain prices next fall are likely to result in producers carrying as many stocker cattle into second-half 1984 as possible in anticipation of strong feeder cattle demand. Incentives to encourage expansion are not likely until most of next year's calf crop is sold in the fall at much stronger prices. Further declines in the breeding herd are likely to be checked as cow slaughter declines beginning next spring and as larger numbers of heifers are retained to enter the breeding herd in the spring of 1985.

#### Calf Supplies Continue To Decline

The supply of feeder cattle outside feedlots on October 1, available for feedlot placement or nonfed slaughter, was up slightly from a year earlier. Calf numbers representing 82 percent of the supply, declined 2 percent. This decline reflects the continual decline in calf-crop size and would have been even lower without a 28 percent reduction in the number of calves on feed on October 1. The yearling supply was 12 percent above last year's level. Despite the summer drought, feeder cattle producers held down marketings resisting sharply lower price bids. Seasonal feeder cattle movement increased in September, but prices are likely to remain under pressure until late winter as the new grazing season approaches. Producers are likely to over-winter as many stocker cattle as possible this winter in anticipation of stronger prices next spring. However, forage supplies, particularly small grain pastures, are likely to limit the number of cattle which can be carried over until spring. First priority on most operations will be to utilize forage supplies to ensure that the breeding herd can be carried into 1984.

Feeder cattle supplies are likely to tighten considerably next year. Supplies may tighten next spring as the new grazing season begins and again in late summer, particularly if a large corn crop is in prospect. Lower grain prices and higher fed cattle prices as the total meat supply decline continues into 1985 is likely to sharply increase the demand for feedlot replacement cattle. Some modest retention of heifers for the breeding herd would further tighten supplies.

### Beef Production To Remain Near Recent Levels

Beef production expectations for 1983 shifted in mid-summer as concerns for prospective record meat supplies were worsened by the sharply rising grain prices, and reduced forage supplies. Beef supplies were above a year ago in first-half 1983 as increased fed cattle marketings more than offset reduced nonfed slaughter. The favorable prospects last fall for cheaper gains and a strengthening economy resulted in 14 percent more cattle on feed at the beginning of 1983. Poor feedlot conditions through mid spring and the PIK wheat grazeout program resulted in reduced placements during the winter quarter, but a pickup in feedlot placement of heavier feeder cattle off the PIK acreage occurred during the spring. Yearling placements, from the fairly adequate supply, have predominated since spring. Sharply higher grain prices have also encouraged placement of cattle at heavier weights. Second-half 1983 feedlot marketings are expected to remain near to slightly above the large levels of a year ago.

The October 1 Cattle On Feed report indicated 4 percent fewer cattle on feed in the 13 major-feeding States. Nearly all of the decrease was from reduced numbers of calves on feed. Steer calves on feed were down 12 percent, while the number of heifer calves was down 52 percent. Yearling supplies of feeder cattle are more than adequate for placements that would keep feedlot marketings near to slightly below year-earlier levels until late spring. Feeder cattle price reductions have already more than offset the higher grain prices. Consequently, feeder cattle placements are likely to remain near this years level's through 1984. Larger numbers of calves should begin to be placed on feed next spring, however, slowing the marketing pace as more days on feed will be required to reach market weight and grade.

In 1983, beef production will be about 3 percent above a year ago. All of the increase will be from a nearly 4 percent larger fed cattle slaughter and consequently about a 6 pound gain in slaughter weights. Cow slaughter is expected to rise 1 percent, but remain well below liquidation levels. Nonfed slaughter was well below year-earlier levels through spring, but moved above in the second half of the year. Sharpest year-to-year nonfed slaughter increases likely occurred this summer, particularly for cows.

### Beef Production To Decline in 1984

Beef production is expected to decline 3 to 4 percent in 1984. Fed beef production will decline from the larger levels of 1983, but remain above marketings in 1981 and 1982. Beef production is expected to be above this year's level through winter as nonfed slaughter remains above a year earlier and fed slaughter remains relatively large. Fed cattle marketings will decline modestly from this years levels, with sharper year-to-year declines likely next summer. Nonfed steer and heifer slaughter is expected to drop below this year's level, particularly in second-half 1984. Beef cow slaughter is expected to decline in 1984 with rates dropping fairly sharply as the grazing season approaches. However, much uncertainty exists on the level of dairy cow slaughter that could result under legislation now being debated to reduce excessive dairy production levels. Slaughter weights are



likely to remain near this year's level as fed cattle marketings, as a proportion of total slaughter, rise moderately.

#### LAMB AND MUTTON

Commercial lamb and mutton production is increasing for the fourth consecutive year, after many years of decline. For the first 9 months of 1983, production was up 5 percent from a year earlier. Extreme drought conditions in southwestern Texas, which accounts for nearly a fifth of U.S. sheep production, are causing a liquidation of breeding herds due to the lack of forage. Many breeding ewes that normally would have been left in the breeding herd for 2 or 3 more years have been sold for slaughter. Lamb and mutton production for 1983 is now forecast at 365 million pounds, up 2 percent from last year. Lamb and mutton production in 1984 is expected to total about 321 million pounds, down 14 percent from 1983 because of the herd liquidation in 1982 and 1983.

#### PER CAPITA RED MEAT CONSUMPTION TO DECLINE IN 1984

Per capita red meat consumption in 1983 is expected to average about 143 pounds (retail-weight-basis), up 4 pounds from 1982. The largest increase was in pork consumption, which rose 3 pounds from 1982's 59 pounds. The rise in pork consumption followed two years of decline. Beef consumption rose a pound to 78 pounds in 1983 from 1982. Lamb and mutton and veal consumption remained unchanged at about 1.5 pounds each.

In 1984, beef consumption may total about 75 pounds, down 3 pounds from 1983. If this level is realized, 1984 beef consumption would be almost 20 pounds below the record 94.4 pounds consumed at the peak of the cattle liquidation in 1976. Per capita consumption of pork may total about 60 pounds, down 2 pounds from 1983. The 1984 pork consumption figure, if realized, would be 8 pounds below 1980. The consumption of the minor red meats will drop slightly but total about 3 pounds.

#### RED MEAT PRICES TO RISE MODERATELY IN 1984

Red meat prices in 1984 may rise only moderately over 1983. However, there will be large variation in the quarterly patterns. In the first quarter, red meat prices probably will be lower than a year earlier due mainly to a sharp decline in hog prices. In the second quarter, red meat prices will be about the same as a year earlier, while in the second half of 1984 prices will be sharply higher.

#### Hog Prices Decline in 1983

During the first 9 months of 1983, barrow and gilt prices at the 7 markets averaged \$49.55 per cwt, down 11 percent from a year earlier. Hog prices averaged \$46 per cwt in September and about \$41.50 per cwt in October. Prices for the fourth quarter are expected to average \$40 to \$43 per cwt. Prices for some hogs will drop to the high \$30's for a short period of time, but are expected to recover as production declines seasonally after Thanksgiving. The improvement in the economy is moderating the decline in hog prices this fall.



Prices in first-quarter 1984 are expected to average \$42 to \$46 per cwt at 7 markets, then rise as production slows on a year-over-year basis and average \$45 to \$49 per cwt in the second-quarter. The economy is expected to continue to grow at a moderate rate and broiler production is expected to increase only slightly. However, per capita broiler consumption will be about the same as last year. Beef consumption will be about the same as last year during the first quarter, but is projected to decline moderately in the second-quarter from a year earlier.

Hog prices in the third quarter of 1984 may average \$52 to \$56 per cwt, compared with \$47 in 1983. Lower pork and beef production along with the continued improvement in personal incomes are strengthening factors. On the other hand, broiler production is expected to increase sharply to fill part of the void left by pork and beef production.

Hog prices in fourth-quarter 1984 are forecast to average \$50 to \$54 per cwt, up about a fourth from 1983. Continued cutbacks in pork and beef production will be the principal strengthening factors. The economic recovery will be moderating, but the delayed strength from the recovery should boost meat prices. Broiler production, on the other hand, is expected to increase as producers are faced with less competition from beef and pork and feed costs decline sharply.

#### Pork Prices To Decline, Then Rise

In 1983, the farm-to-retail price spread may average in the mid 90-cent range, up about 8 percent from 1982. Wholesale-retail spreads are expected to average in the low 60-cent range, up 17 percent from 1983. The farm-wholesale spread is expected to average in the low 30-cent range, down 7 percent from 1982. Given the wage reductions agreed to by many packinghouse workers and moderate inflation, farm-to-retail price spreads are expected to rise only moderately in 1984.

This year retail prices may average about \$1.70 a pound, down 3 percent from 1982. Prices reached a peak of \$1.85 a pound in January and dropped into the low \$1.60 range in September. With the large pork supplies this fall, prices may average around \$1.60. In 1984, retail pork prices may average 2 to 4 percent higher than this year. Prices are expected to rise sharply in the second half of the year from the first-half level. So year-over-year gains in retail pork prices will increase as the year progresses; fourth quarter 1984 prices could be up 13 to 15 percent from the low October-December 1983 level.

#### Fed Cattle Prices To Hold Higher Spring Average In Second-Half 1984

Choice fed steer prices at Omaha in 1983 are expected to average slightly below \$62.50 per cwt, the third consecutive year in which prices ranged narrowly in the lower \$60's. Prices again peaked in the spring and fell off in the second half of the year as meat supplies rose. However, this year total red meat and poultry supplies moved to record levels in the second half. A stronger economy has helped support beef prices despite the large supplies. Were it not for the economic improvement, and improved

consumer confidence, prices would be sharply lower. Despite the very large meat supplies this fall, fed cattle prices are expected to average near \$60, with the strongest prices occurring later in the quarter as total meat supplies decline seasonally. Despite the heavier slaughter weights, cattle feeders have kept marketings current, and feedlots remain very current at present.

Prices in 1984 are again expected to rise through spring. Consequently, with high grain prices, upward trending cattle prices, and favorable feeder cattle prices through winter, marketings are likely to remain current. Fed steer prices may average \$62 to \$66 this winter before rising to the upper \$60's in spring as nonfed slaughter and total meat supplies decline. Expectations of even lower year-over-year declines in meat supplies in the second half of the year plus the economy remaining at the more favorable level, should result in Choice fed steer prices remaining near the mid-to-upper \$60's next summer and fall. Prices are likely to decline modestly next fall as meat supplies rise seasonally.

#### Feeder Cattle Prices To Rise Above Fed Prices in 1984

Weather will be an important price determining factor for feeder cattle through next spring. A mild winter, prospects for a good grazing season and indications of a large grain harvest next fall would all be constructive to feeder cattle price strength. Higher grain prices forced feeder cattle prices well below a year ago in the second half of 1983. Yearling feeder steers at Kansas City averaged above a year ago through spring, but \$5 to \$6 per cwt lower in the second half of the year. Feeder cattle have sold at a discount to fed cattle since spring.

Prices are likely to rise from the depressed fall 1983 levels to the mid \$60's this winter, unless the winter is unusually harsh forcing more stocker cattle on the market as tight forage supplies are depleted. Prices may peak in the low \$70's next spring if weather prospects are favorable. Producers are likely to hold down marketings in expectation of good weight gains over the summer and fairly strong prices next fall if prospects are good for a large grain crop. Second half prices are likely to hold in the upper \$60's.

Utility cow prices at Omaha are expected to average near \$40 per cwt in 1983, unchanged from 1982. Beef cow slaughter may remain below year-earlier levels from spring through next fall. Prices are likely to average in the lower \$40's through this period, with prices remaining in this range next fall when a seasonal decline is typical. However, possible sharp increases in dairy cow slaughter, particularly in the first half of the year could reduce cull cow prices well below these levels depending on upon the level and the timing of sales. Beef producers would likely reduce their culling in anticipation of improved prices later, but forage supplies will dictate the extent to which they could defer culling.

#### Retail Beef Prices To Rise

Retail Choice beef prices have averaged in a narrow yearly range of \$2.37 to \$2.42 since 1980. Prices of Choice beef at retail averaged \$2.42

per pound in 1982 and will likely average 1 to 2 cents lower this year. Farm-to-retail spreads narrowed sharply through spring, but have again widened through summer as fed cattle prices declined. The spread is likely to widen only a little more through fall and to decline again through next spring. However, reduced total meat supplies next spring through summer is likely to result in fed cattle prices retaining much of their spring gains in second-half 1984. Consequently, the spread is not likely to widen as much in the second-half of the year as has occurred during the last two years. Thus, retail beef prices are likely to rise through mid summer and remain at this new higher plateau in second-half 1984 through 1985. Retail prices may average in the mid \$2.40's a pound in the first half with mid-summer prices approaching the mid- to-upper \$2.50's.

#### Lamb Prices To Rise in 1984

Choice slaughter lamb prices at San Angelo averaged \$57 per cwt in the first 3 quarters of 1983, down 2 percent from last year. In the fourth quarter, prices are expected to average \$50 to \$53, compared with \$50 last year. In 1984, prices are expected to average \$56 to \$61 per cwt, compared with about \$56 in 1983. The low production along with price strength in red meat complex are the primary reasons for higher lamb prices.

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Poultry and egg producers can look forward to lower feed costs and higher product prices in the second half of 1984 than in first half, but prospects are not favorable in the first half. Prices will likely be stronger in the first half of the year but costs will also be up sharply. Red meat supplies are expected to be above last year in the first half of 1984, then decline in the second half. Demand for poultry and egg products is expected to improve as the economy continues to expand and the unemployment rate declines.

#### FACTORS AFFECTING THE POULTRY INDUSTRIES

##### Feed Costs

Feed costs from now through July 1984 should be higher than a year earlier, but as the markets anticipate the 1984 harvest, feed costs should weaken if crop prospects are favorable. The corn crop for the 1983/84 marketing year is forecast at 4.3 billion bushels, down from 8.4 billion last year. As a result, prices have increased. The farm price of corn during the 1983/84 marketing year is forecast to average \$3.40 to \$3.80 per bushel, up from \$2.65 in 1982/83. The soybean crop is forecast at 1.5 billion bushels, down from 2.5 billion in 1982/83. The price of 44 percent protein soybean meal at Decatur for the marketing year beginning October 1, 1983 is forecast to average \$230 to \$250 per ton, up from \$187 per ton for 1982/83.

##### The Economy

Preliminary data indicate the Gross National Product (GNP) was up about 8 percent in the third quarter, suggesting the recovery is continuing. GNP is expected to continue the expansion through 1984 but at a slower pace than in the third quarter, and the rate of growth may slow as we move through 1984. However, the unemployment rate is expected to continue its downward trend through 1984.

The recovery in the economy may support more price strength for poultry and eggs than we had in 1982 and early 1983 when unemployment was higher. However, consumers are expected to continue to be careful shoppers--helping demand for poultry and eggs which are usually a competitively priced with other protein sources. In addition, consumers may want more convenience foods, especially in households where husband and wife both work outside the

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home. Those firms that have expanded into this area may enjoy a sales increase as the economy grows.

## BROILERS

First-half 1984 prospects for broiler producers appear unfavorable as the cost of feed ingredients is expected to be sharply higher than last year. With expected plentiful supplies of red meats, broiler prices are not likely to rise as much as the increase in costs.

### Production To Increase

The number of broiler chicks hatched during August was 1 percent below last year and these chicks will be slaughtered in October. During September, the number of chicks hatched weekly averaged 1 percent below 1982, even though the number of eggs set exceeded year-earlier numbers in 3 out of the 5 weeks. Thus, the hot weather during August did reduce hatchability slightly. Production of broiler meat is not expected to be down as much as the chicks hatched numbers would indicate because slaughter weights are beginning to increase from the level in the third quarter. Thus, output in the fourth quarter is expected to be the same to 2 percent larger than the 2,911 million pounds produced in 1983.

During 1983, broiler producers have cut back the hatchery supply flock as measured by the cumulative pullet chick placements 7 to 14 months earlier. In the first quarter of 1984, cumulative pullet chick placements 7 to 14 months earlier will be about 5 percent below 1983 which was 8 percent below 1982. In May, June, and August 1983, pullet chick replacements were the same or above the number placed in 1982. This suggests the hatchery supply flock has about bottomed out and will be expanding during 1984. Since producers can delay sales of their old hens to increase the supplies of hatching eggs, the cumulative pullet chick placements 7 to 14 months earlier is only a rough measure of the hatchery supply flock and does not accurately predict the number of eggs set. For example, the cumulative placements for October 1983 are 7 percent below last year, but the number of eggs set on October 8 were up 1 percent from the same week a year ago.

Since the hatchery supply flock will be down at least through the first quarter, large increases in production may not be possible. However, with feed prices likely to be sharply above last year, producers are not likely planning large increases in production. Red meat supplies are expected to be above 1983 in the first half of 1984. As a result, broiler producers may hold output about even with last year through the first half of 1984. With output off slightly in the third quarter this year and grain prices expected to moderate, broiler output in the second half of 1984 may be up 5 percent over 1983. While this would appear to be a large increase, normally broiler production is about the same in the second half of the year as in the first half. The year-over-year increase in 1984 results from the unusual pattern in 1983, in which second half production will likely be down from first half. Thus with production in second half 1984 forecast to about equal first half 1984 production, the year-over-year increase is 5 percent.

### Prices To Increase

The wholesale price of broilers in the 12 cities in the third quarter of 1983 averaged 54 cents per pound, up from 44 cents in 9 cities last year. Reduced production caused by the hot summer contributed to the increase in prices. With a slight increase in broiler production plus a 6 percent increase in red meats expected in the fourth quarter, the price of broilers in the 12 cities may average 44 to 48 cents per pound, up from 42 cents in the 9 cities last year. During the first quarter of 1984, prices may average 46 to 50 cents per pound in the 12 cities, up from 43 cents in the 9 cities this year. Second quarter prices may average 48 to 52 cents per pound in the 12 cities, up from 46 cents this year. Even with additional output in the third quarter 1984, prices may average 51-55 cents per pound, near this year's 54 cents. In the fourth quarter, prices are expected to average 48 to 52 cents per pound.

### TURKEYS

First half 1984 prospects for turkey producers appear unfavorable. Producers are likely to continue in a cost-price squeeze because feed prices will still be high and turkey prices are likely to be held down by prices of competing meats.

### Production

Output of turkey meat from federally inspected plants during the third quarter was about 754 million pounds, down 1 percent from last year. Since the number of poultts placed was above last year's hatch in May and June but below in July and August, output in the fourth quarter is expected to about equal last year's 759 million pounds. With higher feed prices and plentiful supplies of other meats, turkey producers are expected to slow production in the first half of 1984. Production may be down 6 percent from the 1,043 million pounds produced in first-half 1983. If grain prices begin moderating near planting time and competing meat supplies begin to decline, turkey producers may expand production in the second half of 1984. Production is expected to increase 3 percent in the second half from the 1,530 million pounds produced this year.

Stocks of frozen turkeys in commercial warehouses have been increasing seasonally but are not as large as in previous years. As a result, total fourth-quarter 1983 supply (production plus stocks) is expected to be down 1 percent from the 1,215 million pounds available in 1982. With plentiful supplies of other meats available through mid-1984, stocks are expected to be reduced during the fourth-quarter and by the first of 1984 may be 20 million pounds below the 204 million of a year earlier. Stocks of frozen turkey are expected to continue to be lower during 1984 because of production cuts in the first half and the largest production gain being in the fourth quarter.

### Prices

In the third quarter 1983, the price of 8- to 16-pound young hen turkeys in New York averaged 60 cents per pound, down from 65 cents last year.

Prices usually increase seasonally in the fourth quarter and may average 62 to 66 cents per pound, near last year's 64 cents. During the first half of 1984, prices may average 57 to 61 cents per pound, up from 56.1 cents in 1983. With supplies of red meats down and prices up in the second half of 1984, prices of young hen turkeys in New York are expected to average 66 to 69 cents per pound, up from the 60 to 64 cents this year.

## EGGS

Some egg producers made profits during August and September. Returns are likely to continue favorable during the fourth-quarter 1983. However, first-half 1984 appears less favorable as prices slip seasonally and costs remain high.

### Production

During fourth-quarter 1983, egg production is expected to be down 2 to 4 percent from last year's 1,479 million dozen. Replacement pullets entering the laying flock in the fourth quarter will be down 13 percent from 1982, but more hens are being force molted and kept in production longer. On September 1, 23 percent of the hens had been force molted, up from 20.5 percent last year.

During the first half of 1984, egg production may be 1 to 3 percent below 1983's 2,832 million dozen. Replacement pullets are likely to be down because the hatch so far this fall has been below a year earlier. With replacements down, producers will likely continue force molting old hens. However, the high feed costs are expected to force producers to sell birds when their productivity declines which will likely lower total production.

If grain prices decline by third quarter 1984 and egg prices are about the same as this year, egg producers could be expected to increase the number of replacement pullets. These pullets might add to egg supplies in the fourth quarter. Thus egg output in third quarter 1984 is expected to be near the reduced production of this year but may increase 1 percent in the fourth quarter of 1984 from a year earlier.

### Prices

The prices for Grade A large eggs delivered store door in New York during the third quarter, 1983 averaged 74 cents per dozen, up from 66 cents last year. Egg prices usually strengthen seasonally when school starts around Labor Day. This year prices have remained strong longer than usual reflecting the decline in supply. As a result, prices in the fourth-quarter are expected to average 79 to 81 cents, up from 68 cents last year. With smaller supplies expected in first half of 1984 and plentiful supplies of high protein meats, egg prices may average 70 to 73 cents per dozen, up from 67 cents in the first half of 1983. If prices of competing high protein foods increase, egg prices in the second half of 1984 may average 76 to 78 cents, near the 75 to 79 cents this year.



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The growth in world meat production has been slow during the 1980's with most of the increase attributable to poultry. <sup>1/</sup> World production of red meat and poultry will rise about 1 percent this year and a slight increase is likely in 1984. Red meat production will be up a little over 1 percent with the 1984 output likely to be about unchanged from that of 1983. Projected red meat production for 1984 is less than 1 percent above the 1980 level. World poultry meat production is expected to be up about 1.5 percent in 1983 with an increase of around 3 percent likely for 1984. The expected 1984 poultry production would be around 12 percent larger than in 1980. The growth in poultry would result in about 3 percent more total red meat and poultry output in 1984 than was produced in 1980. World egg production is expected to continue to rise in 1984.

Livestock and poultry producers in many countries will find feed supplies tighter in 1984 than they have been in recent years. Reductions in feed grain and soybean production, principally in the United States, will result in higher feed prices which will moderate gains in meat and egg output in some countries and contribute to declines in others.

The poor economic conditions prevalent in many countries the last few years have dampened demand for livestock and poultry products. Economic recovery is underway in the United States and the international outlook is for the recovery to spread and strengthen further in 1984. This boost to the world economy should improve demand for livestock and poultry products.

#### BEEF AND VEAL

##### Production Declining

World cattle numbers at the beginning of 1984 are expected to be marginally above year-earlier levels after slipping lower in both 1982 and 1983. While cattle numbers may be up slightly, beef and veal production is

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<sup>1/</sup> World inventories and production as used in this paper include estimates for the major producing countries. Estimates are not available for some countries.



expected to decline around 1 percent in 1984. Beef and veal production probably will be down slightly this year after increasing in 1981 and 1982. Expected 1984 beef production would be slightly below the 1980 level and the lowest since then.

In the Soviet Union, cattle numbers and beef and veal production are increasing. For the last few years, poor feed supplies held down cattle numbers and beef and veal production. Improved feed supplies in 1983 enabled an increase in numbers and production. At the beginning of 1984, cattle numbers are expected to be around 119 million head, up from 117.1 million a year earlier. Beef and veal production may total around 7 million tons in 1984, up from 6.8 million this year and about 6.6 million in 1980, 1981, and 1982.

Cattle numbers in Oceania have declined in each year of this decade. Australian cattle numbers declined from 26.2 million in 1980 to 22.5 million at the beginning of 1983. A severe drought in 1982, that broke earlier this year, resulted in a high level of distress slaughter that sharply reduced the inventory. This additional slaughter contributed to the rise in 1982 beef and veal production. Production has been down this year as feed supplies improved and slaughter declined. Cattle numbers may be down a little at the beginning of 1984 with next year's production slipping lower.

While cattle numbers in New Zealand were down at the beginning of this year, beef and veal production has risen. Dry weather conditions resulted in reduced feed supplies and caused an increase in slaughter this year. At the beginning of 1984, cattle numbers are expected to be down from a year earlier and 1984 beef and veal production is likely to decline.

South Africa also has suffered from a severe drought that resulted in liquidation of cattle numbers. Numbers were down at the beginning of this year and another decline is expected for the beginning of 1984. The liquidation held 1983 beef and veal production near the 1982 level, but a substantial decline in production is likely in 1984.

Cattle numbers in Argentina were up at the beginning of this year and another increase is expected for 1984. Beef and veal production for 1983 was down from a year earlier and little change in output is expected for 1984 as numbers continue to grow. Little change in either cattle numbers or beef and veal production is expected for Brazil in 1984. Beef and veal production in Central America was off this year and only a small recovery in output is forecast for 1984.

In the European Community (EC), cattle numbers were up at the beginning of 1983 and another rise is expected for 1984. Little change in 1984 beef and veal production is expected after almost a 3-percent rise in 1983. Beef and veal production in the other Western European countries and in Eastern Europe is expected to show little change in 1984.

Cattle numbers in North America are declining with Mexico accounting for most of the drop. A drought in Mexico contributed to the decrease; the U.S. drought is contributing to a high level of cow slaughter that will hold down cattle numbers. While beef and veal production may recover somewhat in Mexico during 1984, both Canada and the United States are expected to have lower production.

## U.S. Trade Prospects

U.S. beef exports have been expanding; up 16 percent in 1982, 5-7 percent this year, and another increase is expected in 1984. Japan is an important market for U.S. beef, and negotiations have been underway to gain greater U.S. access to the Japanese market. Improved access could contribute to a continued strong growth in U.S. beef exports. While beef exports have been expanding, total exports are still equal to only around 1 percent of production.

Beef production in 1984 is expected to decline in the 3 major exporting countries which ship fresh, chilled, or frozen beef to the United States (Australia, New Zealand, and Canada). This production decline should result in somewhat tighter exportable beef supplies. U.S. beef imports in 1984 are expected to be near to slightly below the 1983 level.

The trigger level for meat imports subject to the Meat Import Law is 1,231 million pounds (product weight) for 1983. Agreements were reached between the United States and the 3 major exporters to prevent beef imports from exceeding the trigger level in 1983. For 1984, much uncertainty has been introduced by U.S. dairy legislation that could have a significant impact on the trigger level.

## PORK

### Production Increasing

World pork production is expected to be up almost 3 percent this year and about 1 percent in 1984. These increases follow declines in 1981 and 1982. The expected 1984 pork production would be about 1.5 percent above the 1980 level.

Soviet pork production may total around 5.6 million tons in 1983, up nearly 8 percent from a year earlier. Yearly production had been held near the 5.2-million-ton level during 1980-82 by poor feed supplies. With feed supplies improving this year, pork production rose and another increase is expected in 1984. If the expected 1984 level of production of around 5.9 million tons is achieved, it would represent about 14 percent more pork than was produced in 1980.

In Japan, pork production continues to rise with increases of around 2 percent anticipated for both 1983 and 1984. Production rose sharply in Taiwan this year but little change is expected for 1984.

Pork production rose in Europe during 1983 and another increase is anticipated for 1984. Almost all EC countries are increasing pork production this year, and only the United Kingdom may show a decline in 1984. Pork production in Spain rose sharply in 1983 while there was little change in the other Western European countries. In 1984, a small increase in Spanish pork output may push the total for Western Europe slightly above the year-earlier level. The sharp drop in pork production in Poland this year was largely responsible for Eastern Europe's decline in output. With a recovery in pork output in Poland during 1984, Eastern Europe's total may increase.

In Mexico, pork production declined sharply this year and a small drop is likely for 1984. Canadian production was up this year, but it may hold about steady in 1984 as feed prices rise. U.S. pork production rose this year, but 1984 output is expected to be lower.

#### U.S. Pork Imports Up; Exports Off

U.S. pork imports were up 13 percent from a year earlier in 1982 and may increase another 7 percent this year, largely as a result of increase in imports from Canada. Pork trade between Canada and the United States is relatively free and Canada is almost the sole supplier of imported fresh, chilled, and frozen pork to the U.S. market. A substantial increase in pork production in Quebec Province and shipments into New England have accounted for much of the larger U.S. pork import level. With U.S. pork prices lower in early 1984 and Canada's output holding about steady, U.S. imports may decline in 1984.

U.S. pork exports were off 30 percent in 1982 and a small decline is likely this year. Japan is an important market for U.S. pork exports. However, when Japan banned Danish pork imports in 1982 because of an outbreak of foot and mouth disease in Denmark, the U.S. share of the Japanese market rose only slightly because of smaller U.S. supplies, higher prices, a stronger dollar and increased competition from Canada and Taiwan. Since Japan has lifted the ban on Danish imports, it will be even more difficult for the United States to expand exports. U.S. pork exports for 1984 are expected to hold near the year-earlier level.

#### LAMB, MUTTON, AND GOAT

##### World Production Increases

World production of lamb, mutton, and goat meat is up this year and another small increase is likely in 1984. Production increases in the EC, Spain, Turkey, New Zealand, and the Soviet Union were largely responsible for the rise during 1983. The drought in Australia contributed to a decline in output there. Production is expected to recover in Australia in 1984 after the drought-related 1983 decline, but New Zealand output may decrease. Soviet production may hold near the 1983 level in 1984.

#### POULTRY

##### World Production Rising

World poultry meat production has shown a steady upward trend for several years. Output is expected to be up 1-2 percent this year and 2-3 percent in 1984. Broiler production, which accounts for over two thirds of total poultry meat output, has shown significant increases in many countries during recent years.

Production in the Soviet Union rose during the last few years when feed supplies were tight and poultry producers received preferential treatment. In 1983, production may be up about 8 percent from a year earlier and around 24 percent from 1980. Poultry meat output is likely to continue expanding in 1984 as feed supplies will be more plentiful.



In Japan--an important market for U.S. exports--production will be up 5-6 percent this year. Output is expected to continue to rise in 1984, but the rate of increase probably will not match that of this year.

The EC's poultry production may be down 1-3 percent this year, but some recovery is expected in 1984. Production in France, the largest EC producer, is off slightly this year and an increase of almost 2 percent may occur in 1984. The expected growth in 1984 poultry production in the EC is highly dependent on the export market, particularly North Africa and the Middle East.

Production in the other Western European countries was off this year largely as a result of a decline in Spain. A recovery in output in Spain may boost 1984 production for the region above the year-earlier level.

Tight feed supplies have resulted in lower poultry production in Eastern Europe for the last 2 years. Most notable is Polish production which declined 58 percent in 1982; another drop of almost 50 percent is likely this year. Some recovery in Poland's output is expected in 1984 but production will still be sharply lower than in 1981. For all of Eastern Europe, production may rise 2-4 percent in 1984.

Brazil has been sharply increasing poultry production, mostly for the export market. With export markets weaker in 1983, Brazil increased output less than 1 percent following a 7-percent-rise in 1982. The economic recovery in many countries around the world is expected to strengthen demand in 1984. With a stronger export market, Brazil once again may increase poultry output. However, if this stronger export market, particularly in North Africa and the Middle East, fails to develop, Brazil's production might not rise as much as expected.

The United States also is expanding poultry production. Higher feed costs are slowing output gains this year and also will moderate the increases in 1984.

#### U.S. Poultry Exports Weaken

U.S. poultry meat exports were off sharply in 1982. Broiler meat exports declined 30 percent in 1982 and are continuing lower this year. The United States has lost some markets to the EC and Brazil, and others have weakened because of the worldwide economic recession and the strong U.S. dollar. U.S. exports will continue to face strong competition from the EC and Brazil in 1984. Economic problems in the EC that might result in lower export subsidies could be positive for U.S. exports.

#### EGGS

#### World Production Continues To Increase

World egg production is expected to be up this year with another increase likely in 1984. The world production increases are occurring despite declines in the United States and the EC, two of the largest producers.



Soviet egg production rose during the years of tight feed supplies, and is expected to continue to rise in 1984 when feed supplies will be more plentiful. Japan also is expanding output this year with further increases likely in 1984. Eastern Europe also is showing a growth in egg output for both 1983 and 1984.

#### U.S. Egg Exports Weak

U.S. egg exports have declined sharply in the face of large world supplies and weak demand. Exports declined about a third in 1982 and this year's level again may be down about a third. With world output expected to be up again in 1984, the United States will continue to face strong competition for export markets. However, with the world economic situation improving, the demand for eggs should strengthen. This stronger demand should help the United States to show some recovery in egg exports in 1984.

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Total red and white meat supplies for the third quarter of 1983 were the largest third quarter supplies on record. Although broiler supplies were down 1 percent from last year, a 4 percent increase in third quarter beef production, coupled with a 13 percent increase in pork production, resulted in the record supplies.

Large red meat production caused hog and cattle prices to average well below last summer's levels. Prices for barrows and gilts averaged \$47 per cwt. this summer, compared to \$62 a year ago. Choice fed steer prices averaged around \$60, down \$3 from last year.

Despite lower grain production and resulting higher grain prices, red meat supplies will remain record large through the winter due to expansion plans made in 1982 and early 1983. In fact, red meat supplies could be above that currently expected if grain prices move even higher, or unfavorable fall and winter grazing conditions continue. Current projections call for total red meat and poultry supplies to exceed year-earlier levels by 4 to 5 percent during the fourth quarter of this year and 3 to 4 percent in the first quarter of 1984. The sharpest year-to-year gains will continue to occur in the pork sector, where production is expected to rise 13 percent over last year during the October-December period, and 8 percent above year-earlier levels for the first quarter of 1984.

By the second quarter of 1984, however, total red meat and poultry supplies are expected to slip about 2 percent from this past spring, reflecting producers' reactions to higher grain prices and weaker livestock and poultry prices through the winter. Prices for all livestock should average near to or above a year earlier in the spring, and continue firming through the second half of 1984 as production falls below this year's record large levels.

Even though livestock prices have weakened since last spring, prices have not gone as low as may have been expected, given the record supplies passing through market channels. Substantial improvement in general economic conditions has occurred since last year. It appears that meat demand is better now than it has been at any time during the 1980's.

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## **Cattle on Feed**

Cattle feeders in the thirteen quarterly reporting states indicated they had 8.47 million head of cattle and calves on feed October 1. This was down 4 percent from last year, but 3 percent more than in 1981.

Net placements of cattle on feed during the July-September quarter were down 5 percent from last year for the thirteen states in total. However, regional differences in placement levels were noticeable. Cattle feeders in the commercial cattle feeding areas of the Plains states placed larger numbers of cattle on feed relative to last year, while farmer-feeders in the Corn Belt, possibly reacting to the sharply higher corn prices, placed significantly fewer cattle on feed. Corn prices in the Plains are currently below those in the Corn Belt, which is an abnormal situation. Wheat prices also are encouraging wheat feeding in the Plains, adding to feed supplies in the region. As PIK grain becomes available, placements may increase in the Corn Belt.

Cattle feeders marketed cattle throughout the summer in line with intentions as reported by the USDA last July. At that time, cattle feeders in the thirteen states intended to market 5.8 million head of cattle, 1 percent more than last year. USDA estimates that cattle feeders in the thirteen major states actually marketed 5.9 million head during the July-September period, near the intended levels as reported last July. Thus, the industry has been moving numbers in a manner consistent with the July report and inventories of cattle that were available at the beginning of the quarter.

## **Feeder Cattle Supplies**

Total supplies of feeder cattle available for feedlot placement as of October 1 were 1 percent above the same time last year. Although steer and heifer slaughter in the third quarter was around 1.2 million head above 1982, imports of live feeder cattle were up by a similar amount, offsetting the increased disappearance by slaughter. Thus, 3 percent more total yearling cattle on July 1, coupled with 3 percent fewer on feed October 1, resulted in available supplies of yearling cattle outside feedlots on October 1 to be up 10 percent from 1982.

Movement of feeder cattle from summer pastures has been occurring later than normal this year. This has been a factor in the increased supplies outside feedlots. As feedstuffs are drawn down over the next few months, larger numbers of feeder cattle likely will be placed in feedlots. Also, the increased yearling supplies lend support to ideas of fairly large levels of nonfed steer and heifer slaughter.

Supplies of calves under 500 lbs. were 2 percent below last year. This implies tighter feeder cattle supplies by early 1984.

## **By-Product Values**

One factor that has helped provide strength to fed cattle prices this summer has been higher prices received for by-products such as hide and tallow. Prices for cattle by-products, or "drop values", have been substantially above the levels of the past three years. The drop values accrue to packers, allowing them to pay more for live animals even when carcass beef prices do not advance.

The largest component (around 50 percent) of the drop value is made up by hide prices. In turn, by far the largest use of leather is the shoe industry. Most hides are exported and return to the U.S. in the form of shoes. Improving economic conditions have resulted in increased retail sales for consumer goods like shoes and other goods which use leather, such as autos. The stronger U.S. dollar relative to the past few years has also aided in an increase in imported shoes.

Rising fats and oils prices, mainly resulting from reduced world soybean production this year, have strengthened tallow prices. This has also aided in increasing drop values.

## **Prospects**

The peak in monthly fed cattle marketings for 1983 likely has passed. Fewer fed cattle will be marketed from feedlots during the fourth quarter than during the same period last year. Still, this does not mean that beef supplies will tighten substantially in upcoming months. In fact, seasonally large slaughter of nonfed steers and heifers as well as increases in cow slaughter will keep beef production fairly high.

However, even though beef production during the fourth quarter will be above 1982, production should decline from the third to the fourth quarter of 1983. An analysis of the 1970's and early 1980's indicates that beef production normally increases about 2 percent from the third to the fourth quarter. At the same time, average fed cattle prices normally drop 4 to 5 percent from the third to the fourth quarter. In the past 13 years production in the fourth quarter was less than in the third quarter in only three years. However, each time this occurred, prices in the fourth quarter exceeded those for the third quarter. Using current projections, beef production will decline 2 to 4 percent from the third to the fourth quarter in 1983. If these projections are correct, it appears likely that fed cattle prices will be above the \$59 average for the July-September quarter.

The larger supplies of available yearling feeder cattle on October 1, coupled with the higher grain prices, will keep pressure on feeder cattle prices for the next several months. If fed cattle prices advance through the winter and spring as currently anticipated, lower numbers of calves available for placement will combine with stronger fed cattle prices to push feeder cattle prices significantly higher by the second quarter of 1984. Adding fuel to this expected price increase will be the fact that numbers of yearling cattle next spring off of winter wheat pastures will be severely limited due to lack of grazing this winter.



One factor that clouds the outlook for 1984 cattle prices is proposed dairy legislation still being debated by Congress. There is considerable discussion as to how many additional cull dairy cows may be marketed in 1984 if legislation is enacted. Although cow beef is not in direct competition to Choice beef, any additional supplies of beef will adversely affect steer prices. Increased cow culling of 250,000 head or less in the first half of 1984 likely will have minimal effects on Choice steer prices. Additional supplies in the magnitude of 500,000 head during the first six months could result in declines of \$2 per cwt. or more in fed cattle prices.

The table shows projected prices for the next three quarters. The projections do not include allowances for significant increases in cow culling.

## AVERAGE QUARTERLY CATTLE PRICES

	1981	1982	1983	1984a/
<b>CHOICE STEERS</b>				
-dollars per hundredweight-				
<b>9-1100 lb. Slaughter Steers</b>				
Quarter I	\$63	\$64	\$63	\$63-65
II	68	71	68	66-68
III	67	65	59	
IV	62	60	60-62 a/	
<b>6-700 lb. Feeder Steers</b>				
Quarter I	70	63	68	62-64
II	65	65	66	66-70
III	64	66	57	
IV	63	63	56-58 a/	
<b>4-500 lb. Steer Calves</b>				
Quarter I	79	67	74	65-68
II	75	73	76	68-72
III	69	70	63	
IV	68	66	61-63 a/	
<b>COWS</b>				
<b>Utility Cows</b>				
Quarter I	44	39	40	38-40
II	44	42	43	40-44
III	44	42	38	
IV	38	36	34-36 a/	

a/ Projected for Midwestern and Plains areas.

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Considerable uncertainty currently surrounds international dairy product markets. Even if world economic conditions improve markedly in 1984, the overall outlook is for production of dairy products to grow faster than use in available outlets. Thus, there is little optimism for strengthening in international dairy product prices over the next several months.

Here in the United States considerable uncertainty has occurred during 1983. Even with new legislation by Congress, it would be several months before production and use regain a balance in the manufactured dairy products market. Thus, it is likely that there will be no price gain in the near term, but there could be a decline.

#### World Dairy Situation and Outlook

Cow's milk production is up significantly for the 36 major dairy countries. The combined output for these countries is now expected to exceed 401 million metric tons for 1983, a 3 percent rise from a year ago. Most of the gain is coming from increased productivity, since cow numbers are relatively stable. Milk production in the USSR and Poland rose dynamically due to a continuing improvement in feed and forage supplies during 1982 and 1983. The European Community (EC) may register a 3-1/2 percent gain for 1983 as milk output is up sharply in the United Kingdom, the Netherlands, and the Federal Republic of Germany. Milk production also made sharp advances in Australia and Japan. In contrast, both Canada and Mexico are expected to post a decline this year.

The outlook for 1984 is for a small rise in World milk production of around 1 percent. Some further increase is anticipated for the USSR if feed and forage supplies remain adequate, since cow numbers will begin 1984 near year earlier levels. EC milk production may grow by only 1 percent next year if cow numbers do not expand as they have in 1983. Higher concentrate costs and less abundant carry-over supplies of roughage will likely hold back any sharp gain in EC milk output next year. Limited export prospects for butter and cheese are expected to keep New Zealand's 1984 milk production at the 6.8 million ton level for the third year in a row.

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Table 1. Fluid Cow's Milk Production

- - - - - Millión metric tons - - - - -

<u>Major Producers</u>	1981	1982	1983 (Estimated)	1984 (Projected)
EC-10	104.9	108.2	112.0	113.1
USSR	88.9	90.1	95.0	97.0
United States	60.3	61.6	62.7	62.5
Oceania (Aust./N.Z.)	12.0	12.2	12.4	12.6
Other Countries *	<u>116.1</u>	<u>117.0</u>	<u>119.2</u>	<u>120.1</u>
Total	382.2	389.1	401.3	405.3

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\* Includes 22 other major milk-producing countries.

With more milk available and demand for fluid milk rather sluggish, production of butter, cheese, and nonfat dry milk is expanding rapidly.

#### Butter and Butteroil

Production of butter in the 36 major dairy countries is expected to top 6.8 million metric tons (MT) in 1983, an 8 percent rise from 1982. Surplus milk output in the EC is being converted into butter and other dairy products. Commercial use of butter has declined and, with a weak export demand, government-owned stocks are building rapidly in the EC. As of mid-September 1983, EC intervention stocks (government-controlled) totaled 840 thousand MT, a sharp gain from 385 thousand tons on hand a year ago. By year's end, EC stocks are likely to continue well above a year earlier even if there is a subsidized sale of 120,000 MT of Christmas butter to the general public. In the U.S., increased Government purchases of butter are being donated domestically under the special program for the needy, and butteroil is being donated abroad under the section 416 program. As of October 1, uncommitted stocks of butter owned by the Government's Commodity Credit Corporation (CCC) at 177,000 MT were slightly below year earlier levels.

Butter production in the USSR turned upward in 1982 after four years of decline and may be up around 10 percent this year as Soviet milk output recovers to 1977-1978 levels. Soviet imports of butter which exceeded 200 thousand MT in both 1980 and 1981 have dropped sharply the past two years. An improved domestic supply situation and foreign exchange problems have curbed Soviet butter imports. In the developing oil-exporting countries of the mid-East, dairy product consumption expanded rapidly during the 1970's. However, imports of dairy products declined in 1982 and may be down again this year.

Demand for butter and butteroil on international markets is much weaker than a year ago, and prices have fallen sharply. Butter prices last fall ranged from \$2,000 to \$2,050 per metric ton, free-on-board (f.o.b.) ship at major world ports. By September of 1983, prices had fallen to \$1,680 to \$1,720 per MT. Butteroil prices during the fall of 1982 ranged from \$2,000 to \$2,500 per MT and are currently being quoted at \$1,850 to \$1,940 per MT. Even lower butter and butteroil prices are anticipated in coming months.



### Nonfat Dry Milk (NDM)

Nonfat dry milk (NDM) production for 1983 may near 5.1 million MT in the 36 dairy countries, and, like butter, is expected to register an 8 percent gain from a year earlier. Output is up sharply in the EC, the U.S., and Japan. Stocks are accumulating rapidly in both the EC and in the U.S. In mid-September, EC intervention stocks were at 1,021 thousand MT up sharply from the 575 thousand MT on hand a year earlier. For the U.S., uncommitted CCC stocks on October 1, 1983 at 611 thousand tons were 61 thousand tons above October 1982.

In 1982, prices for NDM declined from the \$1,050-1,100 level early in the year to \$800-850 per ton by fall as demand slackened, particularly after mid-year. World trade in NDM was down in 1982 but stabilized during the first half of 1983. NDM prices on international markets in September were quoted at \$700 to \$770 per metric ton f.o.b. with some tenders for marginal amounts as low as \$650 per ton. Export prices are expected to stabilize at the \$700-770 level over the near term.

### Cheese

Production of cheese worldwide will increase in 1983, but at a rate of growth slower than in 1982. In total, output this year is expected to reach 8.9 million MT, up only 2 percent from 1982. Output rose over 4 percent in 1982 and world trade in cheese was lively, with prices for cheddar cheese fluctuating around \$1,750 per ton throughout much of 1982. Competition on international markets intensified during the latter part of 1982 and has continued keen in 1983. With increased production and building stocks, prices have suffered. Cheddar cheese prices this past September dropped to a \$1,300-\$1,500 per ton level. Total cheese exports have been rather stable this year. Output and consumption of cheese are not expected to increase very much in 1984.

### United States Situation and Outlook

Here in the United States, record milk production and lower commercial disappearance have resulted in weak prices and a record level of USDA purchases during 1983. Currently, 1984 presents nearly the same picture. Under current law, milk production is expected to be down slightly while commercial disappearance will likely improve somewhat, leaving USDA purchases above 14 billion in 1984. With continued heavy purchases, very little upward price movement for milk and dairy products is expected until late 1984.

### Milk Price Support: Recent History

Before looking at the outlook for milk production, disappearance, and prices in 1984, let's review the recent history of dairy price supports. During the spring and summer of 1982, several different bills were introduced in Congress calling for changes in dairy legislation to deal with the surplus milk production and the expanding Government holdings of butter, cheese, and nonfat dry milk. The Congress held hearings on the dairy problems, and late in the summer included dairy provisions as Title I of the Omnibus Budget Reconciliation Act of 1982. The new law set \$13.10 per cwt as the minimum



support price for the marketing years beginning October 1, 1982 and October 1, 1983. For the marketing year beginning October 1, 1984, the minimum support price will be the level of parity that \$13.10 represented on October 1, 1983--64.9 percent.

In addition, effective October 1, 1982, to September 30, 1985, the Secretary of Agriculture may provide that 50 cents per cwt be deducted from the proceeds of the sale of all milk marketed commercially by producers, if net price support purchases for the marketing year are expected to equal or exceed 5 billion pounds milk equivalent. The funds collected are to be remitted to the Commodity Credit Corporation (CCC) to offset part of the cost of the milk price support program. Effective April 1, 1983, to September 30, 1985, the Secretary may provide for deduction of an additional 50 cents per cwt, if net marketing year purchases are expected to go over 7.5 billion pounds milk-equivalent. At the same time, though, a program must be established to refund the second 50-cent deduction to those producers who lower their output by a specified amount. In 1983, under the dairy provisions of the budget law, USDA held the level of price support at the minimum--\$13.10 per cwt for the 1982/83 marketing year (October 1, 1982, through September 30, 1983) and began a deduction of 50 cents per cwt on all milk sold by producers on April 16.

USDA announced on August 2 that the support price of manufacturing-grade milk will be \$13.10 per cwt for the 1983/84 marketing year (October 1, 1983, through September 30, 1984), and that an additional 50 cents per cwt will be deducted from the proceeds of sale of all milk marketed commercially from September 1, 1983 through September 30, 1984. Producers who reduce milk sales by 8.4 percent below their marketing base (the average of sales during marketing years 1980/81 and 1981/82) may claim a refund of the second 50-cent deduction.

Today's outlook for 1984 is based on current law (the budget act of 1982). The support price minimum at 64.9 percent of parity will require an increase on October 1, 1984,--currently estimated to be \$14.18 per cwt, a gain of more than \$1. In addition, it is assumed that the deductions remain in effect for all of 1984.

#### Milk Production

Milk production during July-September was up 2.5 percent from a year earlier; September marked the 53rd consecutive month of year-to-year increases. The continued gains this summer were the result of additional cows and greater output per cow than a year ago.

Although cow numbers showed month-to-month increases this summer, they should decrease this fall as lower returns for milk, higher feed costs, and better off-farm employment opportunities cause dairy farmers to cull more intensively. Under current law, cow numbers will likely average a slight gain from 1982, but they may be down 2 to 2.5 percent in 1984.

After slowing this spring, estimated gains in output per cow began to accelerate again this summer. June showed only a 1.2 percent increase over a year earlier, while September registered a gain of 2.4 percent. Despite high concentrate costs, year-to-year gains are expected to continue through 1984, because of very high culling rates, better management, and genetic improvement. For 1983, output per cow is likely to be up about 2 percent from 1982's record 12,316 pounds. For 1984, an increase of 2 to 3 percent is projected, because feed costs are expected to decline by midyear and also because the extra day in leap year will add 35 pounds to annual output per animal.

On balance, gains in total milk production will likely slow late this year, given the expected decline in cow numbers. Total production for 1983 will probably be up about 2 percent from 1982's record 135.8 billion pounds. With gains in output per cow nearly balancing the decline in average cow numbers, production in 1984 is projected to be down slightly. However, under conditions of uncertainties dairy producers tend to postpone major production decisions--delaying the exit of some producers and the herd reductions of others. Thus, continued price support policy uncertainties would likely prolong the expansion in milk production.

#### Milk Prices

For the first 9 months of this year, the all-milk price received by farmers averaged \$13.47 per cwt, 3 cents lower than last year. However, when the price is adjusted for the 50-cent deduction that started April 16, and for both the 50-cent deductions in September, the effective return per cwt during January-September is down 36 cents (2.7 percent) from a year earlier. The price will likely recover seasonally--by 50 to 70 cents by December. With supplies ample, this year's average price probably won't change much from 1982's \$13.59. However, the deductions will lower the effective returns to farmers, by about 52 cents. The average all-milk price in 1984 is expected to be \$13.95, given the current law and its requirement of a higher support price on October 1, 1984, but effective returns in 1984 are projected to be \$12.95, down slightly.

#### Wholesale and Retail Prices: Little Change

Wholesale prices for butter, cheese, and nonfat dry milk are near year earlier levels. They have been nearly unchanged since October 1980 because supplies are more than ample and the CCC support purchase prices are unchanged. In September, the Bureau of Labor Statistics (BLS) index of wholesale dairy prices was 250.5 (1967=100), up only 0.6 percent from a year earlier.

Because of continued large supplies, no change in the support price and the support purchase prices this fall, and no direct effect from the 50-cent deduction on processor costs for milk, wholesale dairy product prices are expected to be near current level until late-summer 1984. Wholesale prices will likely move higher in late 1984, as the current law requires a high support price which will result in higher purchase prices.

Retail dairy prices are reflecting overabundant supplies. The Bureau of Labor Statistics' retail price index for all dairy products stood at 250.2 (1967=100) in September, up 1.3 percent from a year earlier. Retail dairy prices are likely to show a gain of 1.5 percent in 1983 and 2 to 4 percent in 1984.

#### Commercial Use

First-half commercial disappearance of all milk and dairy products, on a milk-equivalent, fat-solids basis, was down almost 2 percent from a year earlier. Sales because of strength in the economy are expected to return to the year-earlier level during the second half, leaving yearly disappearance down about 1 percent from 1982. The weakness of sales may be partly due to the large USDA donation of dairy products. Sales in 1984 are expected to be unchanged to up 2 percent.

#### USDA Removals

With milk production higher and commercial disappearance lower in 1983 than last year, purchases by the Commodity Credit Corporation are expected to total between 16 and 18 billion pounds (milk-equivalent), compared with 1982's 14.3 billion. January-September purchases were 14.6 billion pounds, up 20 percent from a year earlier. Purchases in 1984 are expected to be 1 to 3 billion pounds lower because of slightly less production and possibly higher disappearance.

#### Compromise Legislation Proposed

Following a number of meetings between Administration officials and both majority and minority members of the Agriculture Committees of the Senate and House, a possible compromise on new dairy legislation was reached. The bill was passed by the House and Senate committees during the summer. After a summer recess, the bill was amended and passed by the full Senate and will likely be considered by the House next week. If passed and enacted, the compromise measure would supersede all dairy provisions of the Omnibus Budget Reconciliation Act of 1982.

As passed by the Senate, the bill would set the minimum support price for October 1, 1983, through September 30, 1985, at \$12.60 per cwt. However, if on April 1, 1985, the Secretary of Agriculture estimated that projected annual CCC purchases would exceed 6 billion pounds, milk equivalent, he could reduce the support price by 50 cents per cwt. An additional 50-cent-per-cwt cut in the support level could be made on July 1, 1985, if annual purchases were projected to exceed 5 billion pounds, milk equivalent.

The bill also contains a mandatory 50-cent-per-cwt deduction on all milk marketed to help fund a paid diversion program. The paid diversion would be \$10 per cwt for milk not marketed below a certain base. Under the program, a producer would specify a 5- to 30-percent contract reduction below the average of his fiscal 1981 and 1982 marketings, or below his fiscal 1982 marketings, whichever he selected. The Secretary would have the authority to adjust individual contracts downward if the sum of contract reductions exceeded the total needed. Producers who elected to contract would be required to sign up for the duration of the program.



Both the paid diversion and deduction authority would apply only to the 48 contiguous States and would end on April 30, 1985. The bill as passed by the Senate also includes a mandatory deduction of 15 cents per cwt for dairy product promotion, research, and nutrition education.

#### Conable Amendment

In consideration of the compromise next week, the House is likely to debate an amendment by Conable that would replace all provisions of the bill. It would lower the minimum support level for 1983/84 and 1984/85 to \$11.60

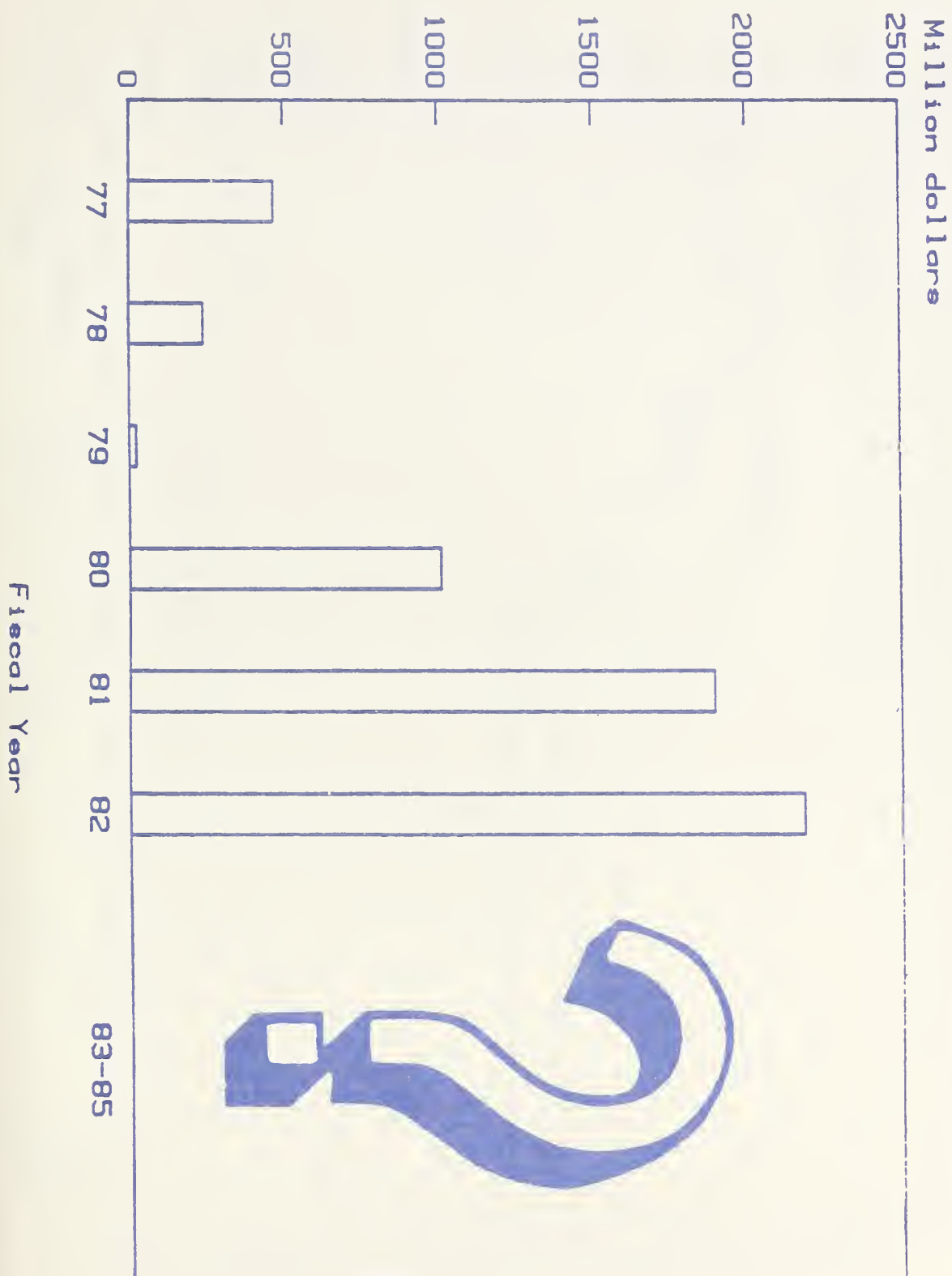
In a recent letter to the Minority Leader of the House of Representatives, the Secretary of Agriculture notes that he has long maintained that the soundest, simplest remedy for the difficulties of the dairy support program is to give the Secretary discretion to adjust the price support. It is an approach that provides the long-term flexibility needed to meet rapidly changing circumstance.

The Secretary notes that the Administration continues to believe that a simple adjustment in price support for dairy is superior to the compromise, but would support the compromise in the context of a bill that provided needed adjustments in target prices. Target price changes have not been accepted by Congress and, therefore, the Administration supports the Conable amendment.

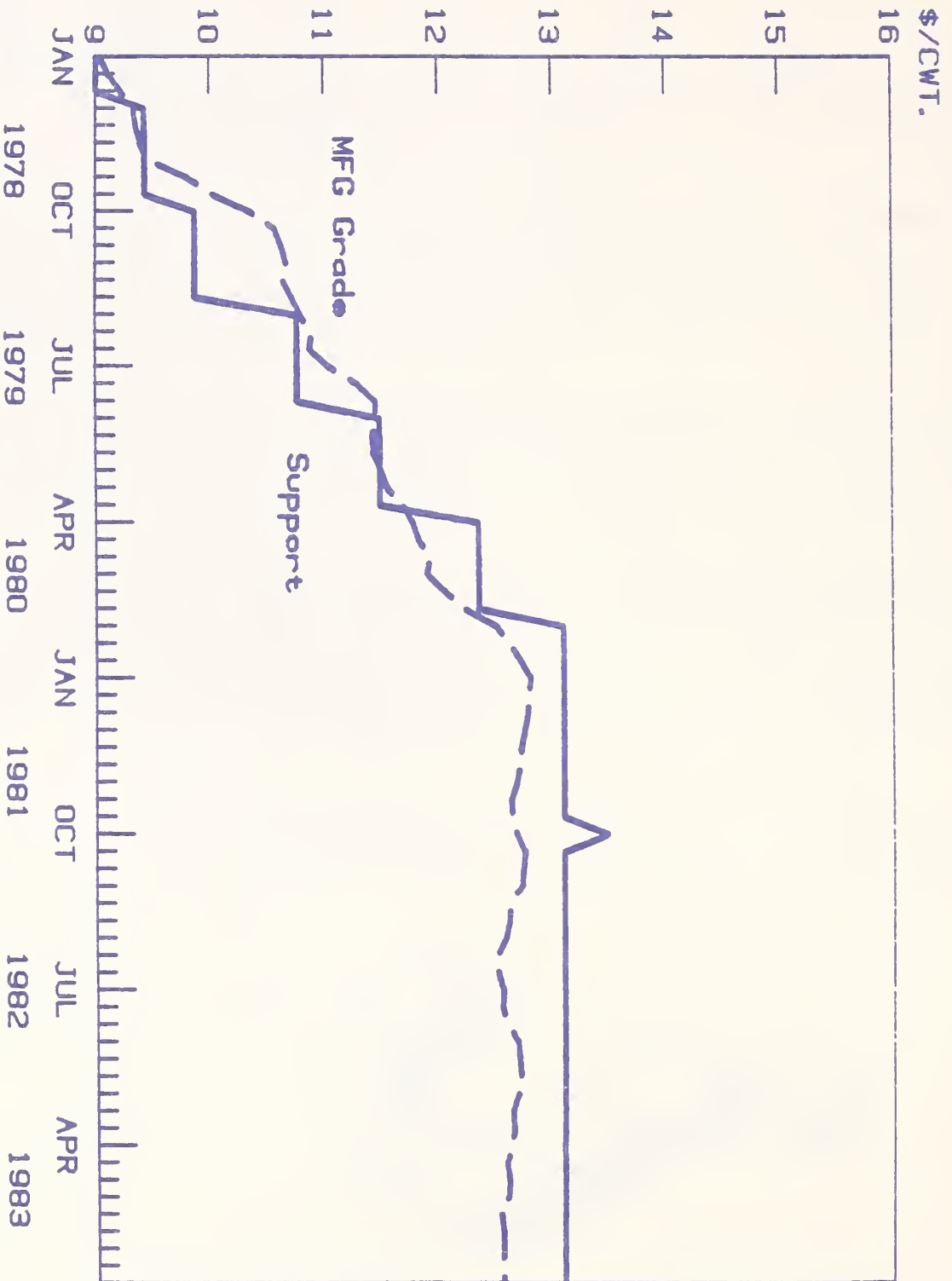
To recap, the dairy industry can expect 1984 to be similar to this year under current law. Milk production relative to commercial disappearance will still be excessive, thus USDA removals will remain large and keep farm milk and wholesale and retail dairy product prices near year-earlier levels. However, if new legislation is passed the outlook will likely be different from that presented here today.



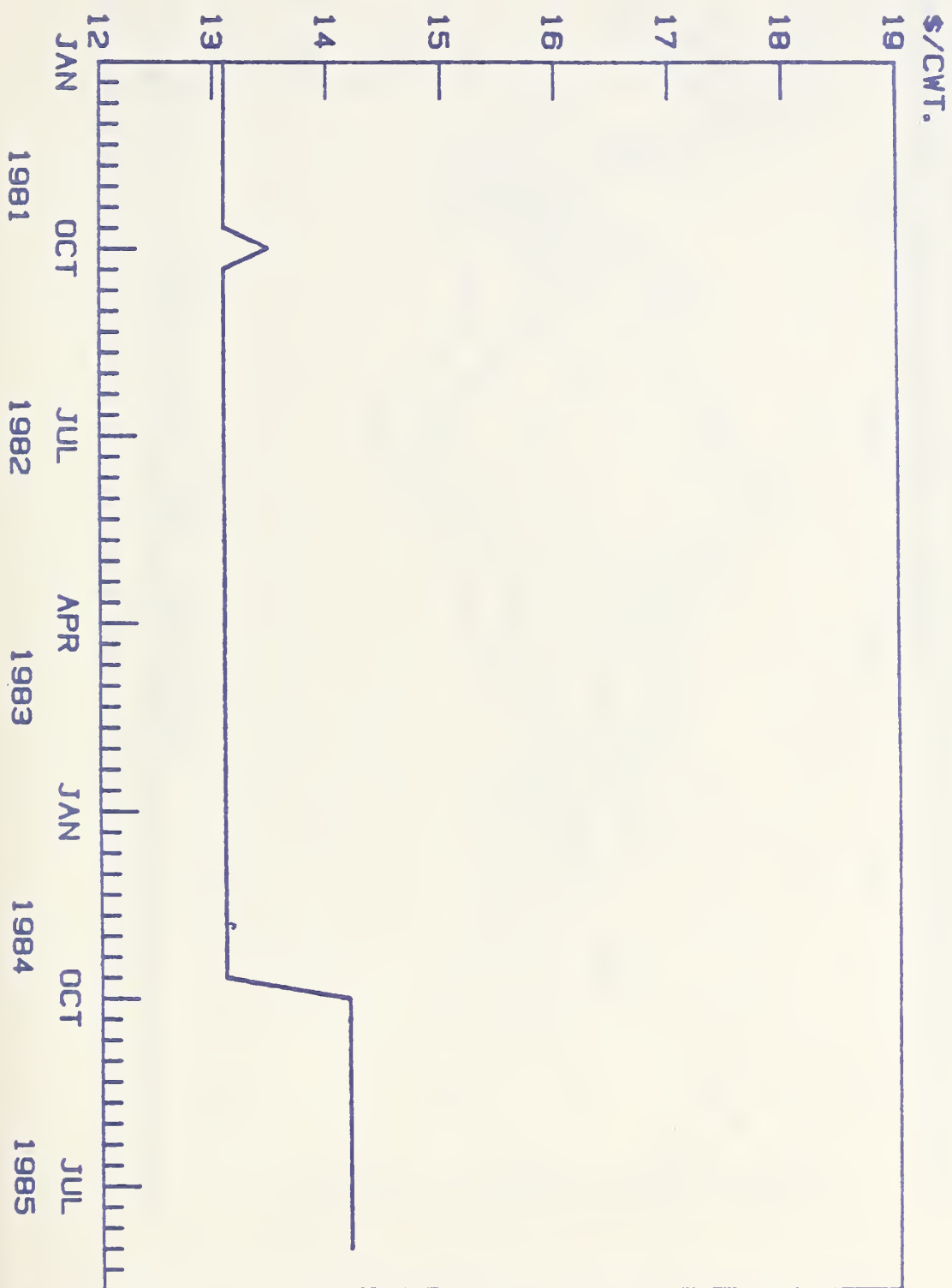
# Net Expenditures for Dairy Program



# Milk Prices

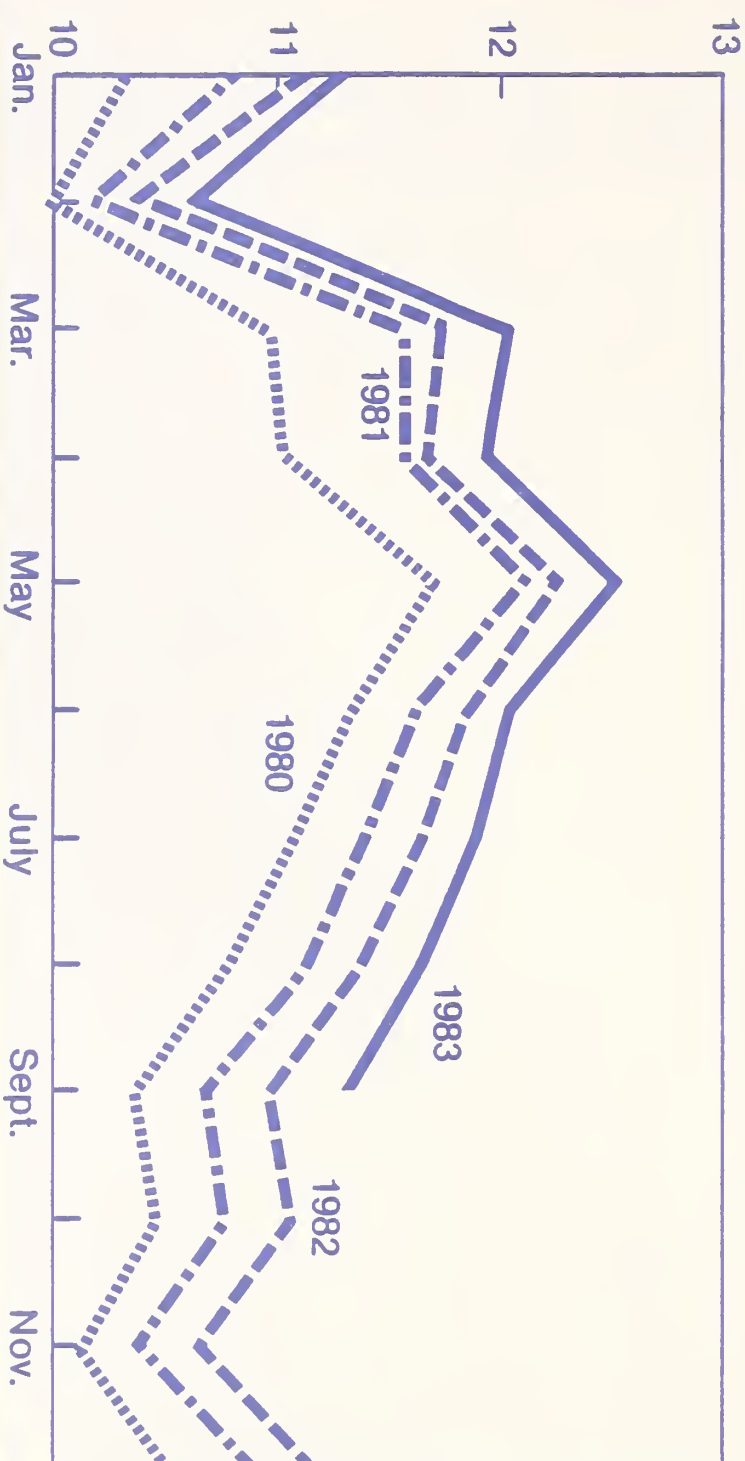


# Milk Prices



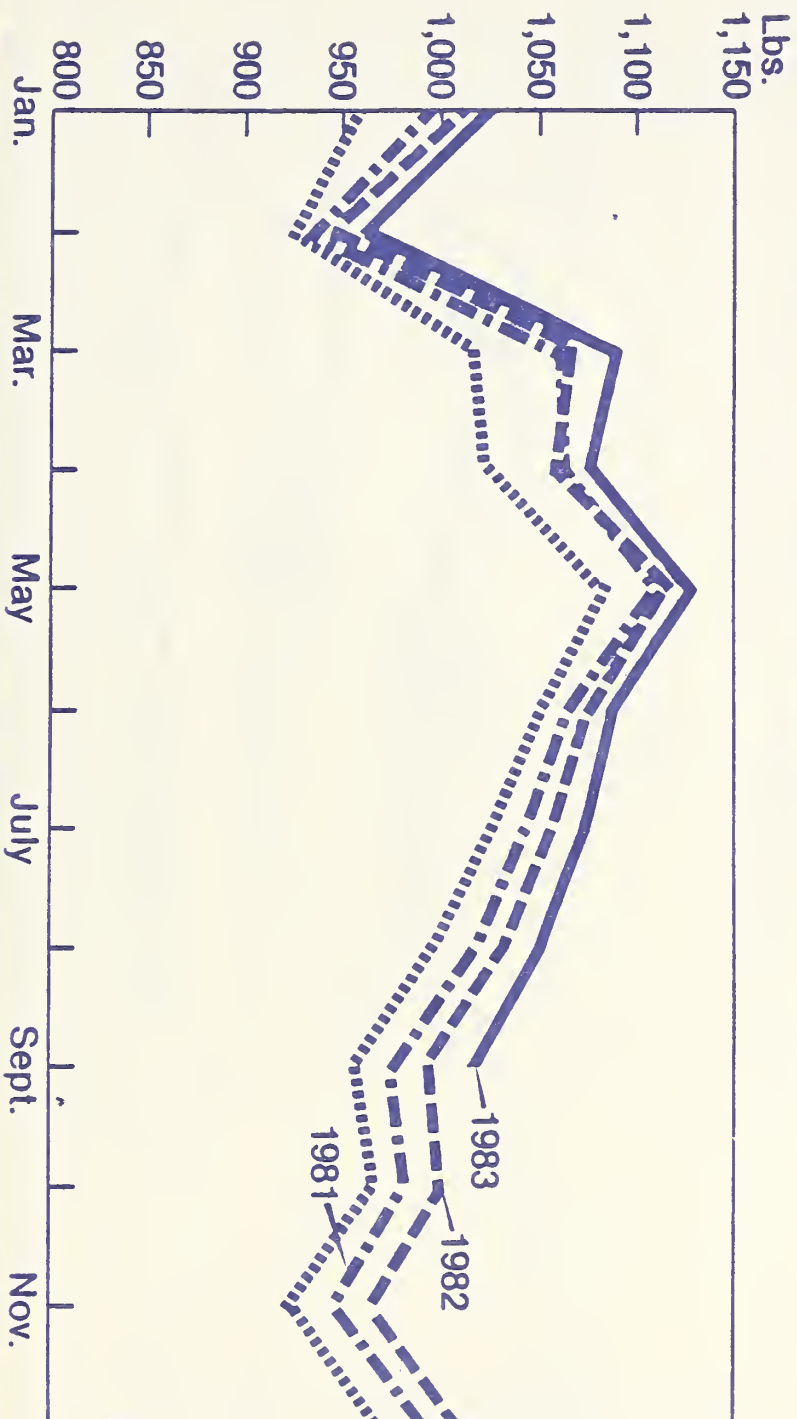
# U.S. Milk Production by Months

Bil. lb.



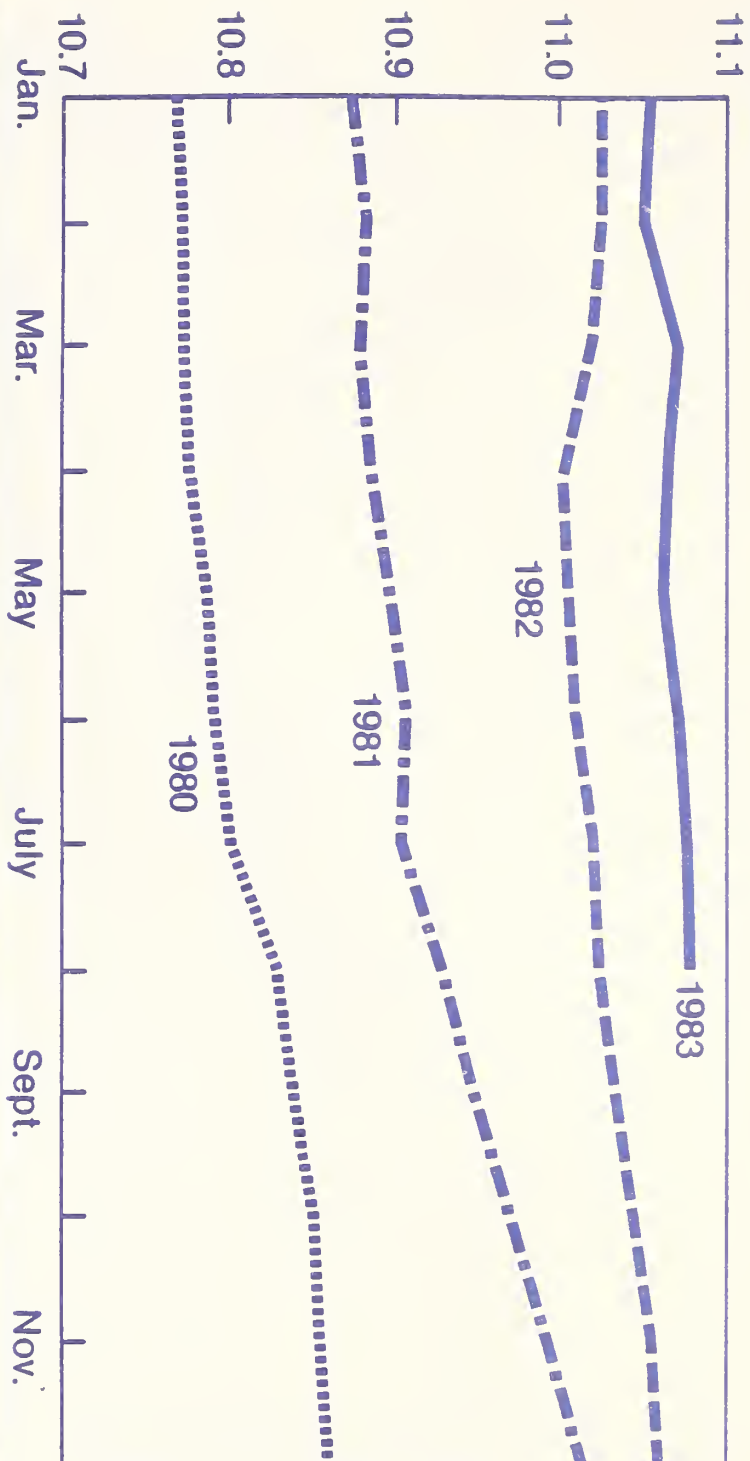


## Milk Production Per Cow



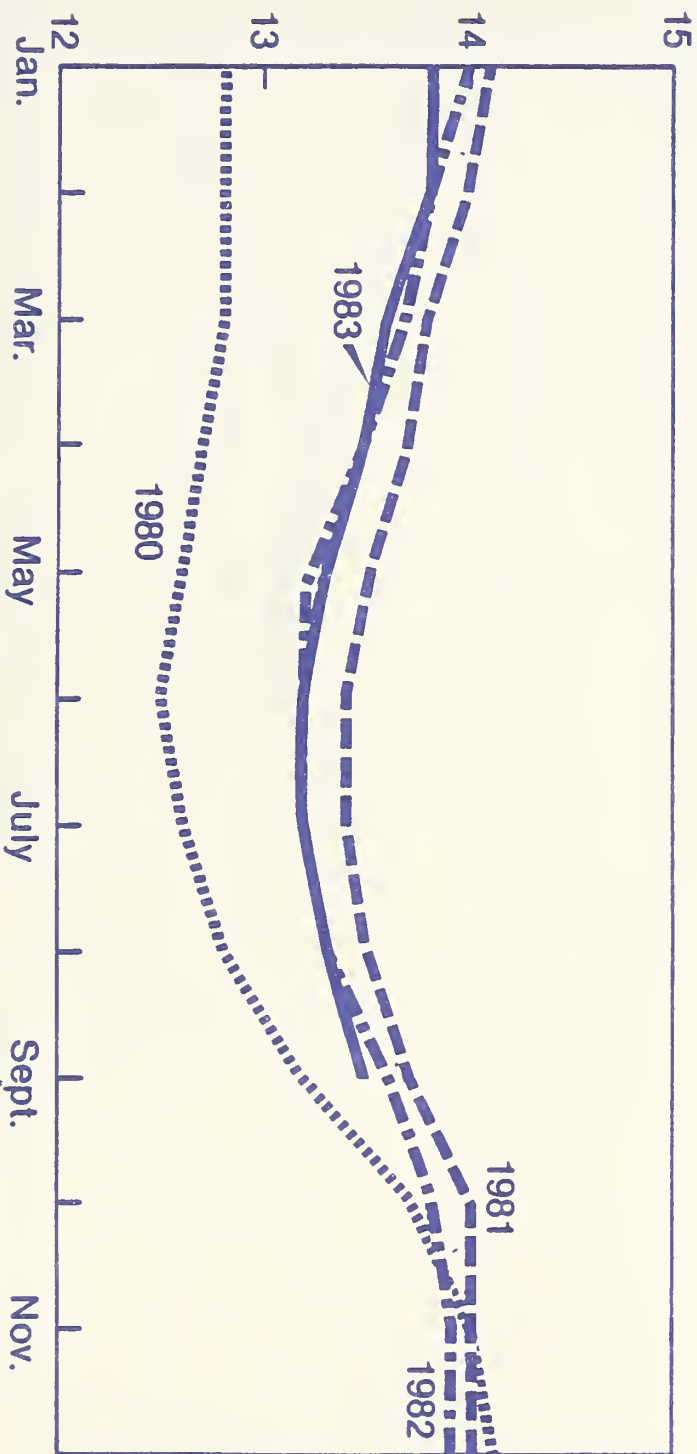
# Milk Cows on Farms

Mil. head



# All Milk Prices \*

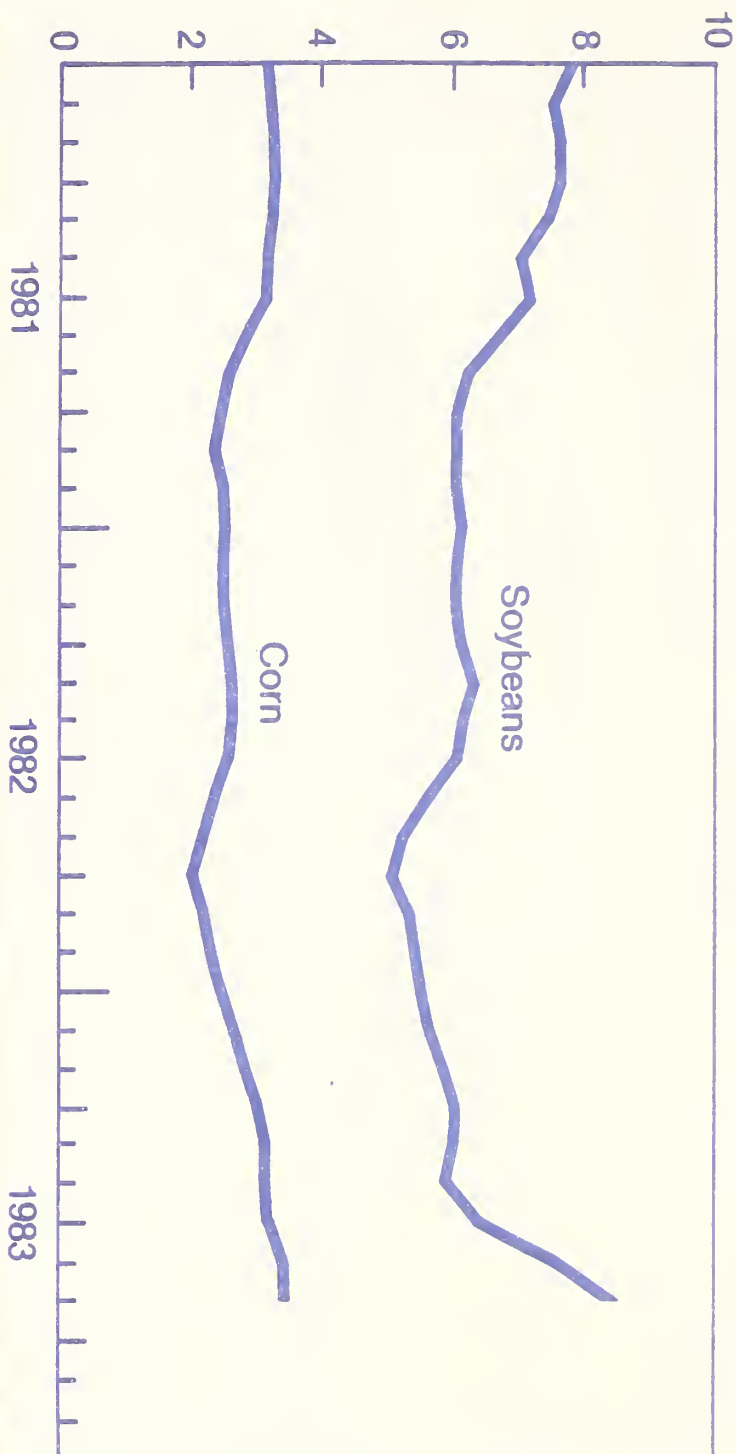
\$/cwt.



\*U.S. average price received by farmers for deliveries to plants and dealers.

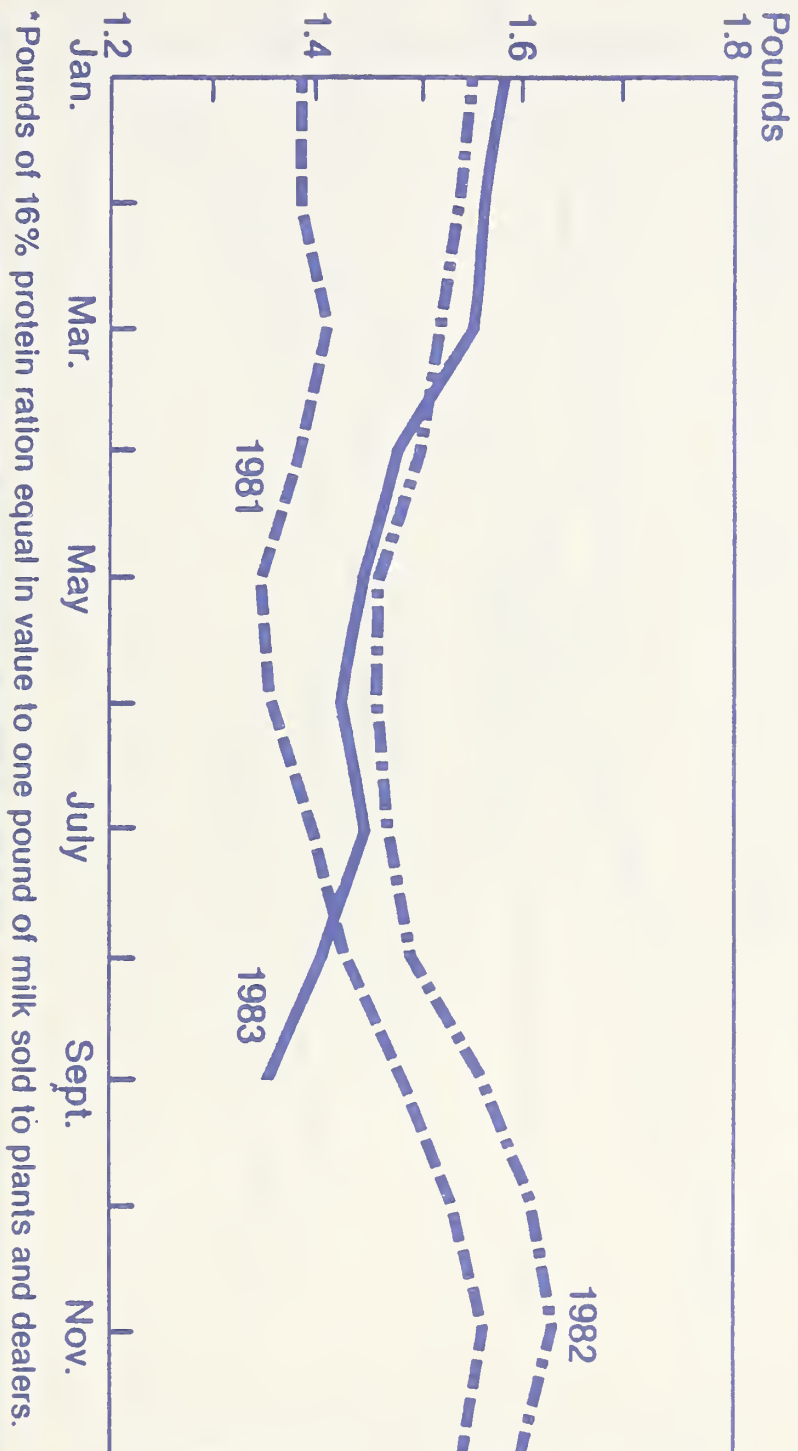
# Prices Received by Farmers, U.S.

Dollars per bu.

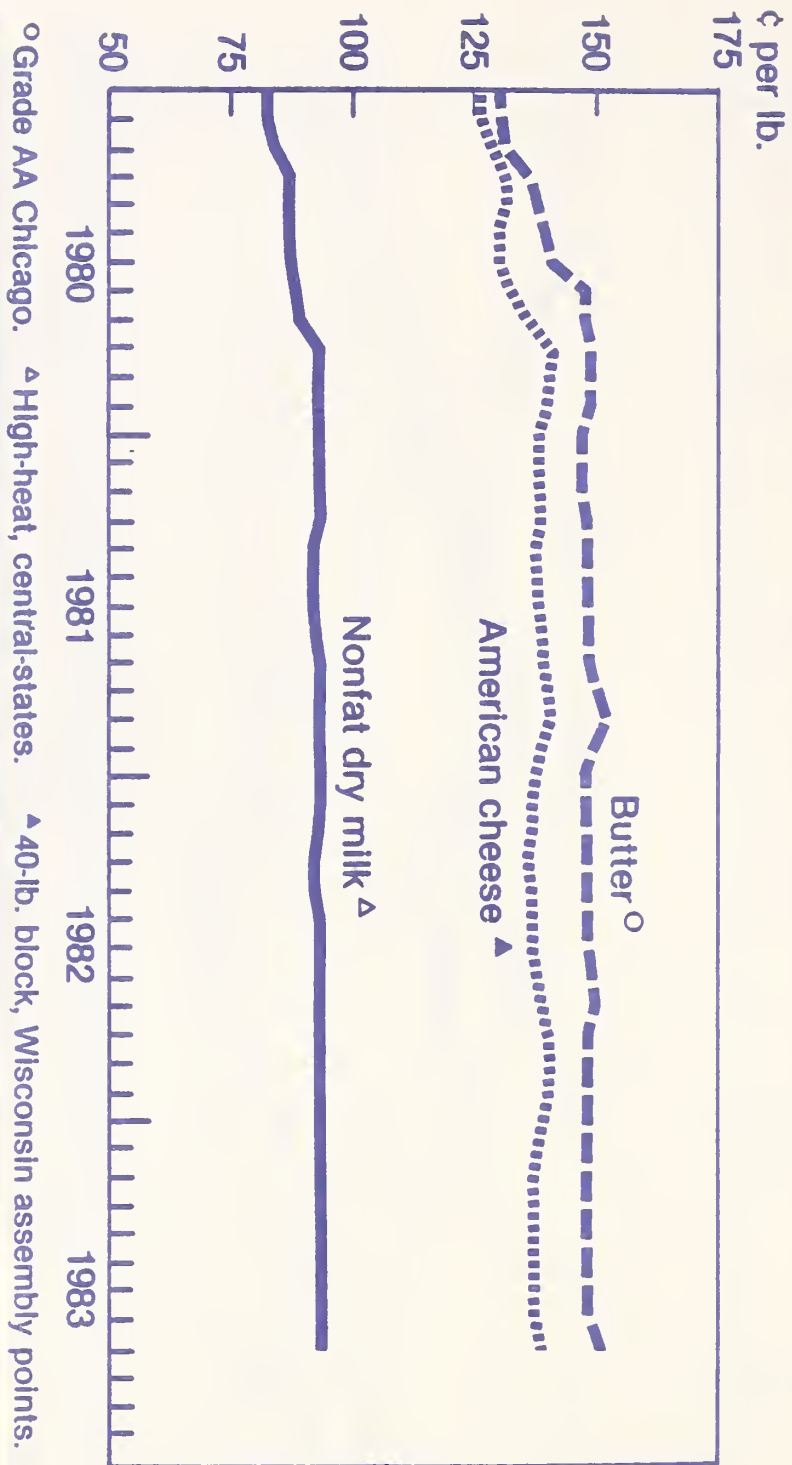




## Milk/16-Percent Feed Price Relationship \*

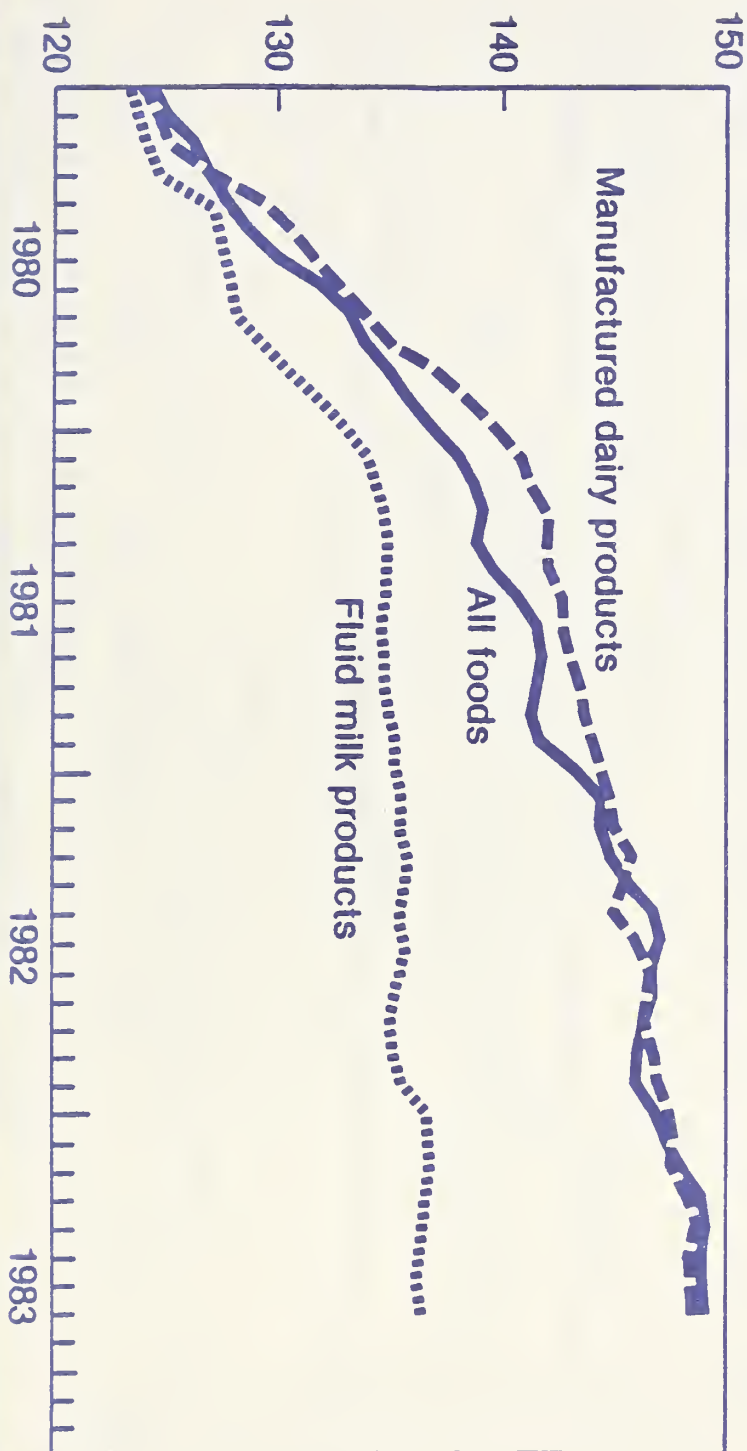


# Wholesale Dairy Product Prices

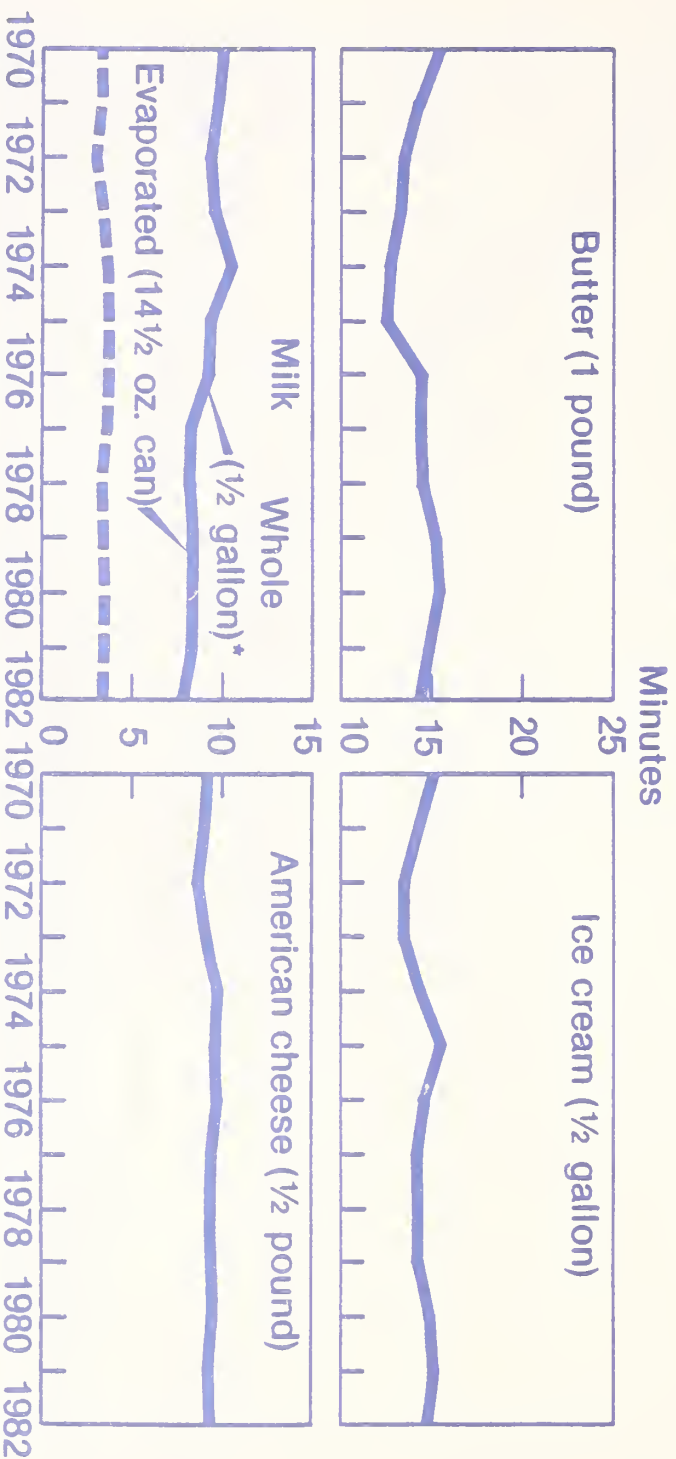


# Retail Food and Dairy Product Prices

Dec. 1977 = 100



# Minutes Worked Earning Money to Buy Selected Dairy Products<sup>Δ</sup>

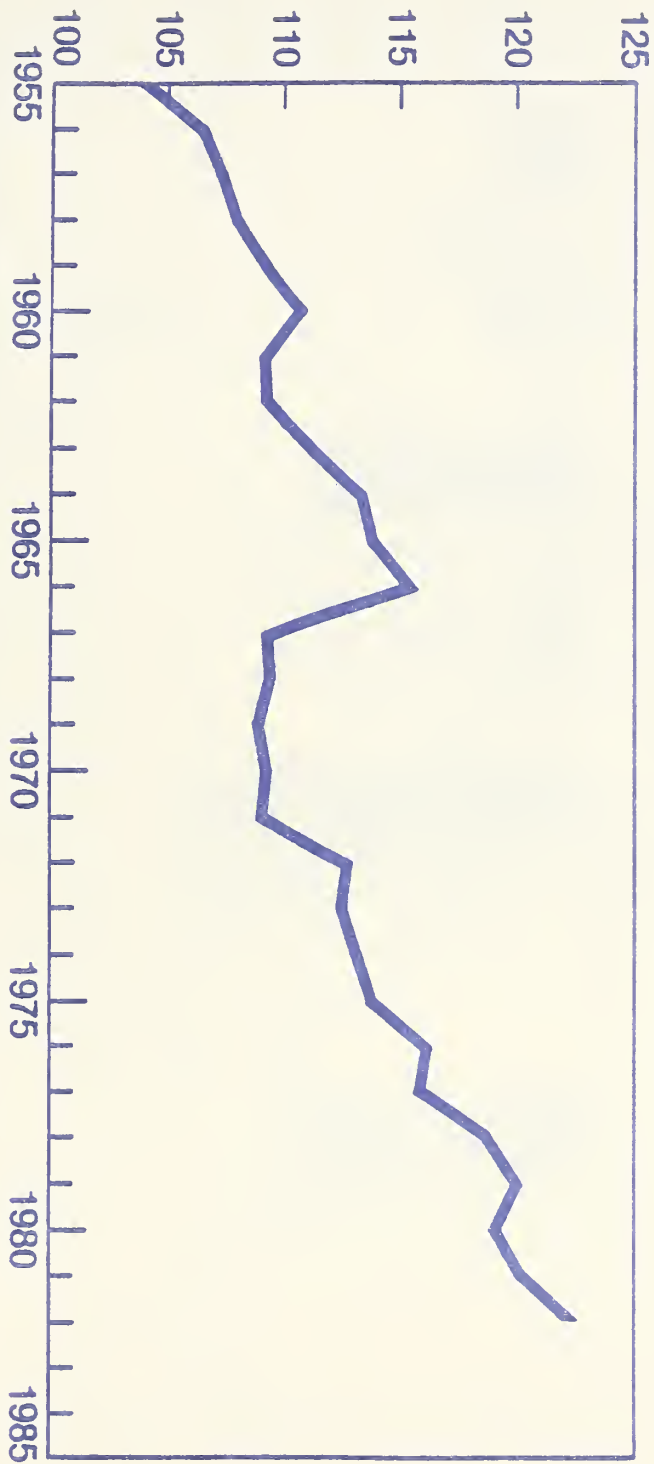


<sup>Δ</sup>Data are based on hourly wage rates of all manufacturing industries. \* Bought at stores.



# Total Commercial Disappearance \*

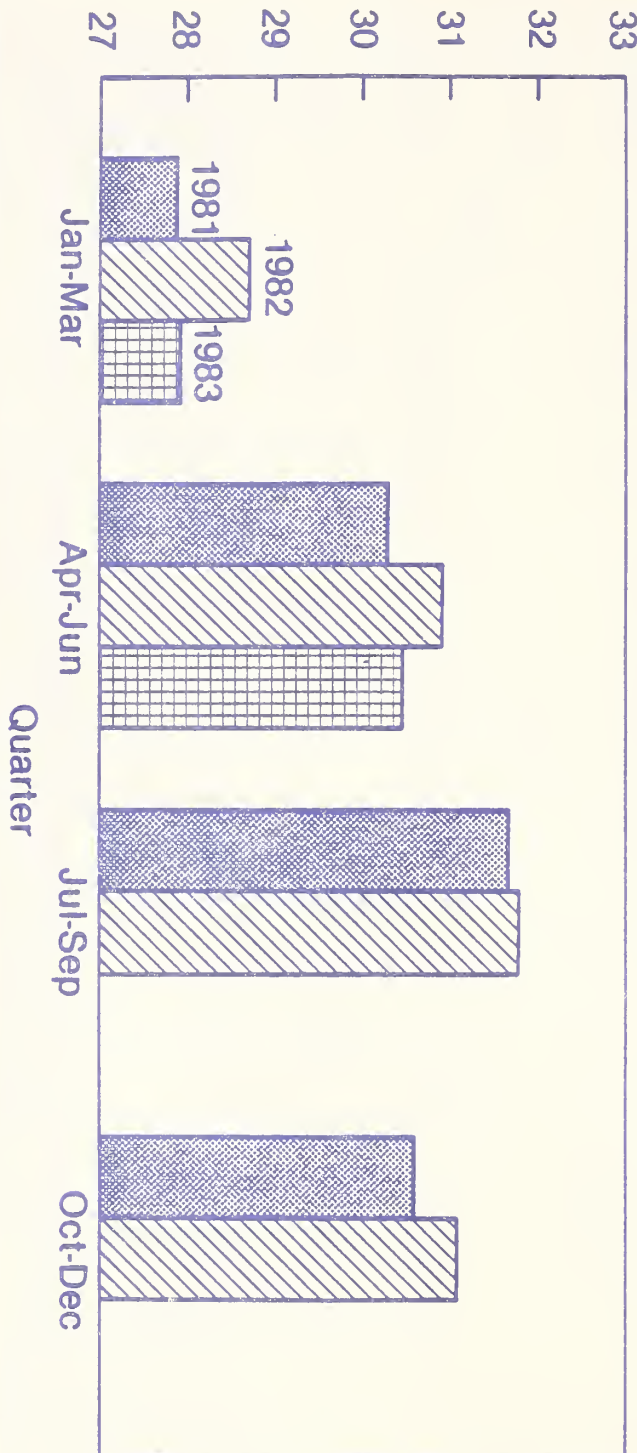
Bil. lb.



\* Milk in all products.

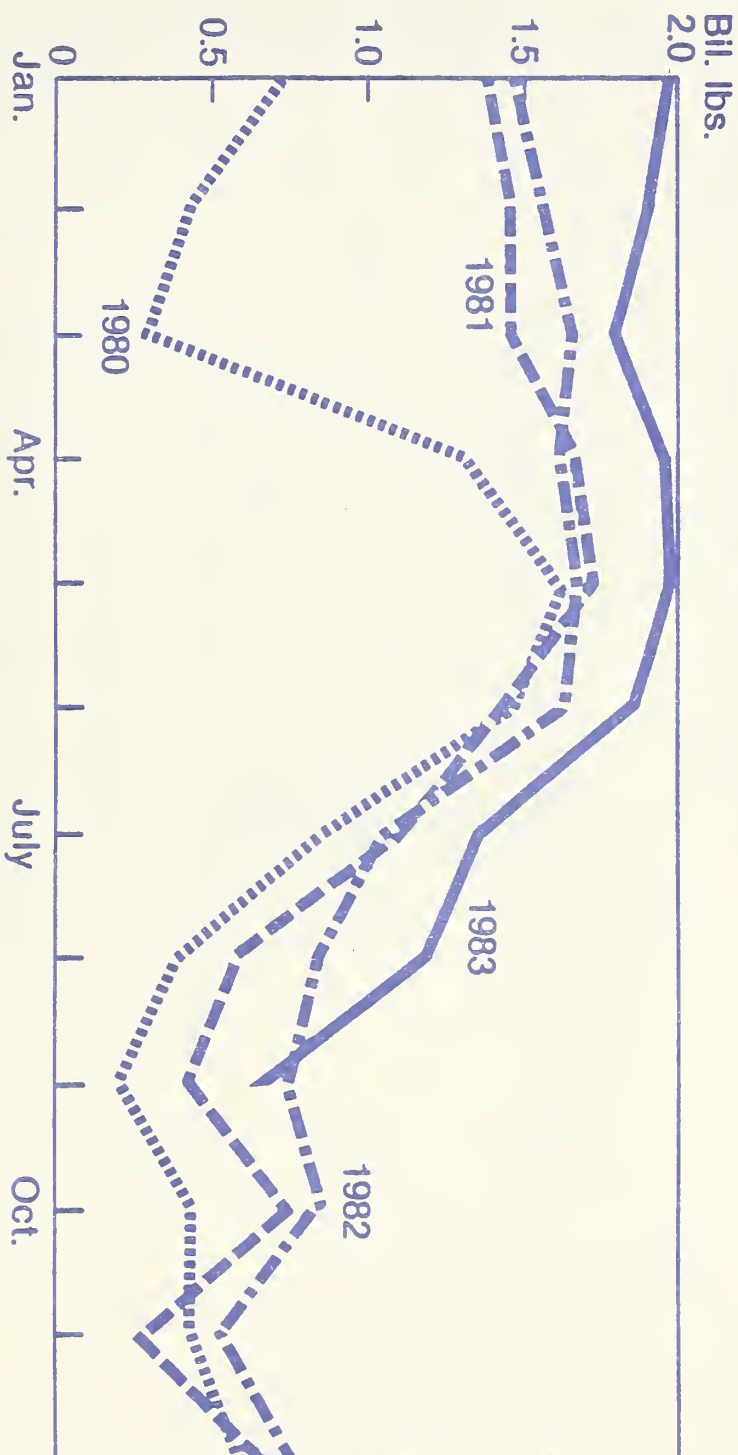
# Commercial Disappearance of Milk in All Products \*

Bil. lb.



\* Milk equivalent.

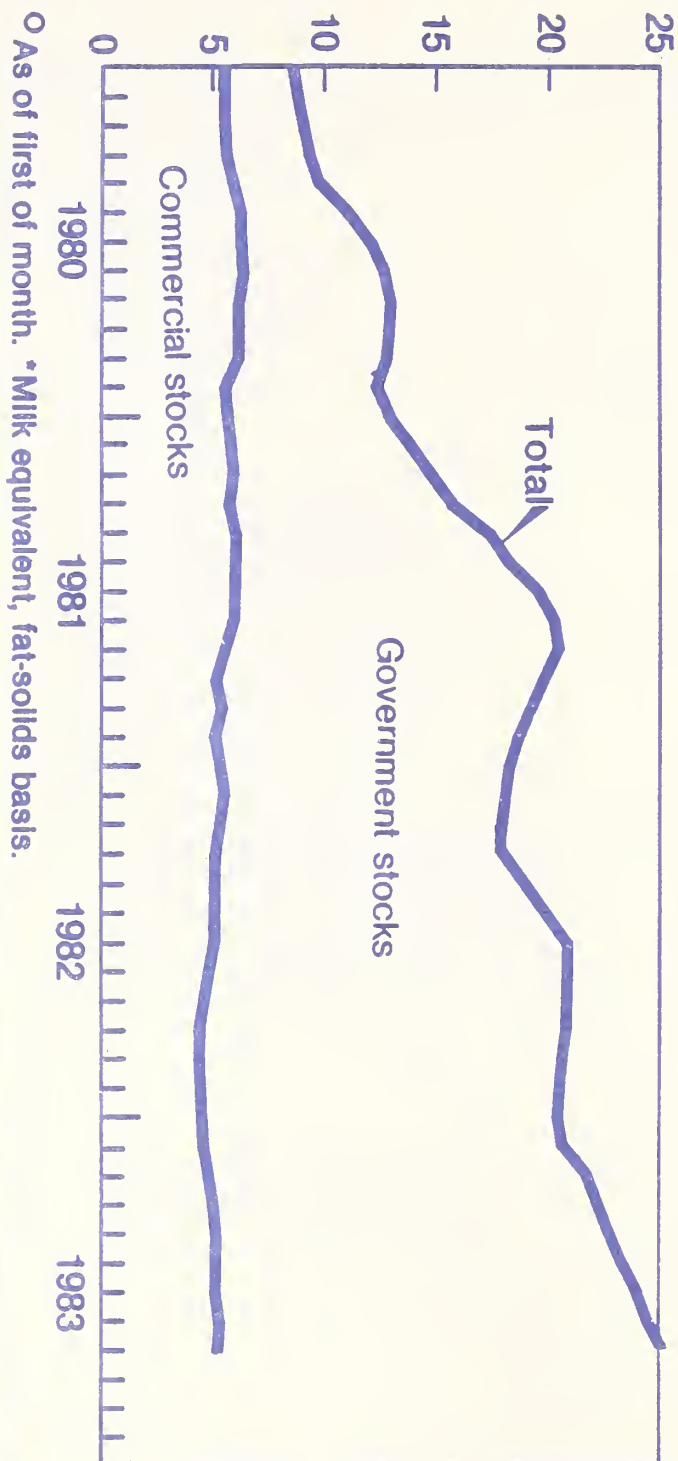
# USDA Dairy Product Purchases\*



\*Net removals, milk equivalent, fat-solids basis.

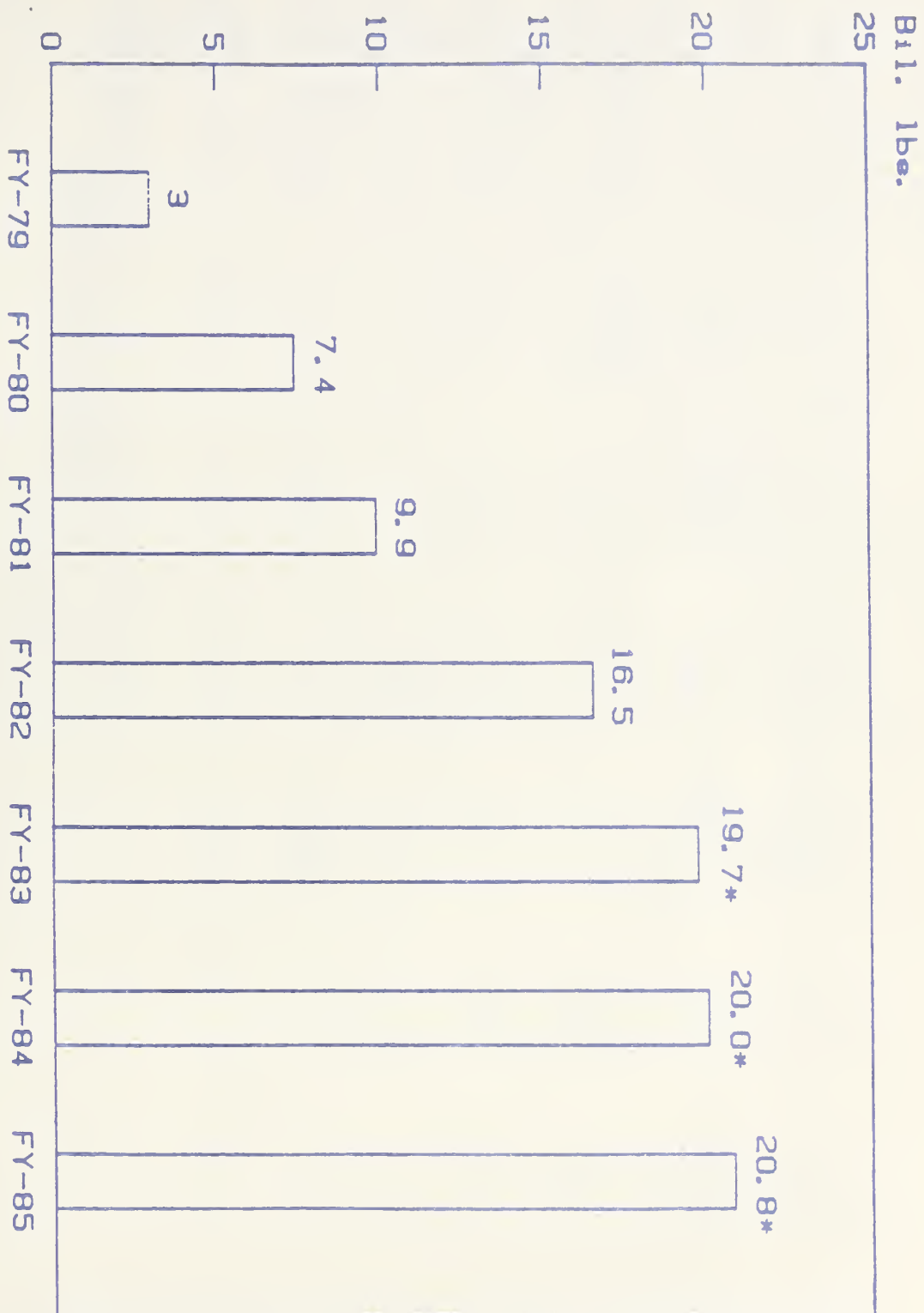
# Dairy Product Stocks:° Milk Equivalent Fat Solids Basis, Beginning Jan. 1

Bil. lb. \*





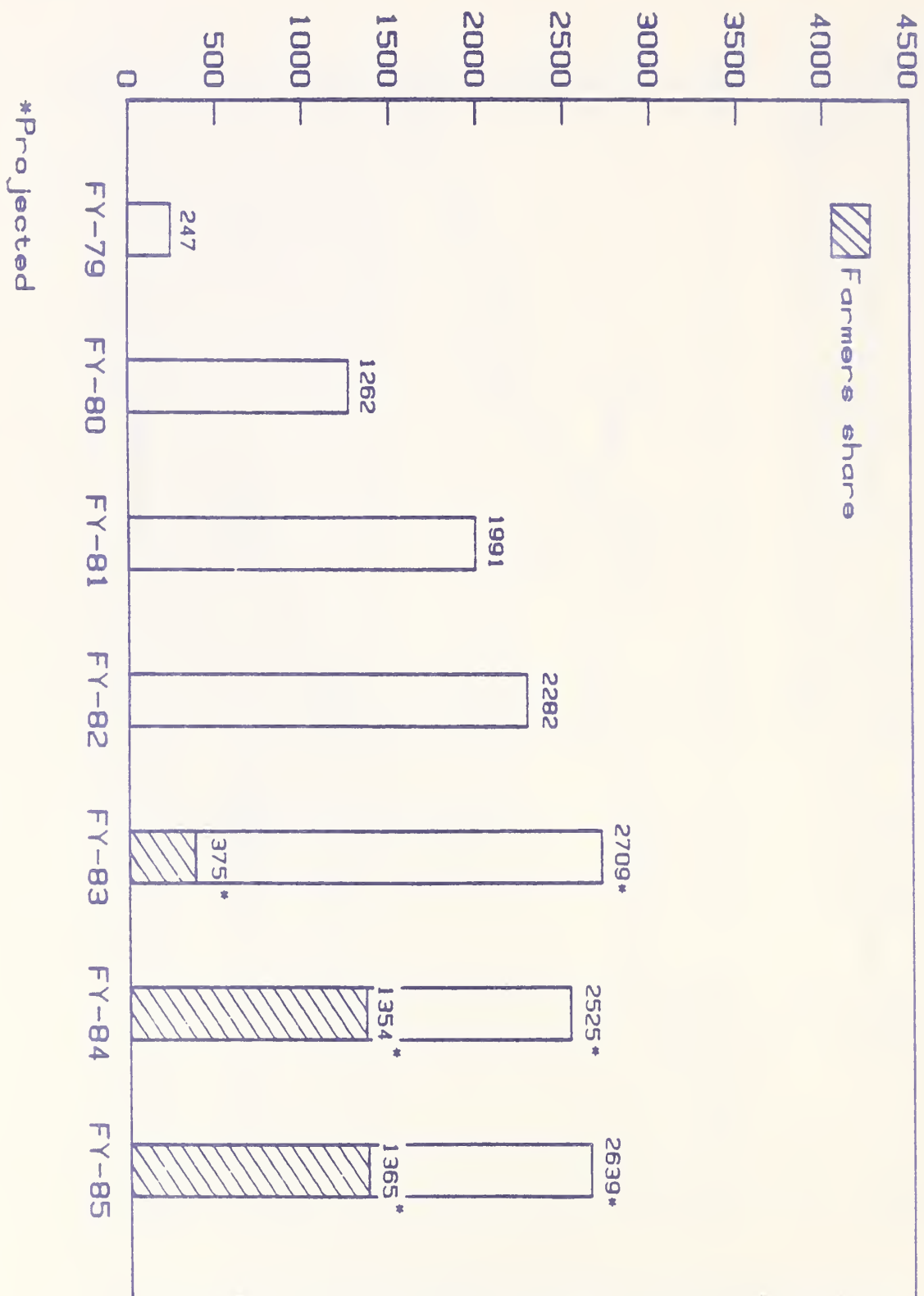
# CCC Dairy Products Uncommitted Inventory 1/



1/ Milk-equivalent, fat-solid-base, end of year. \*Projected.

# CCC Milk Support Program Purchase Costs

Mil. dol.



		PERCENT CHANGE	1983	PERCENT CHANGE	1984	PERCENT CHANGE
PRODUCTION	135.8	+2.1	138.2	+1.8	137.7	-0.4
TOTAL SUPPLY	141.3	+2.2	143.0	+0.8	142.7	-0.2
USE	122.4	+2.1	121.3	-0.9	122.5	+1.0
STOCKS, ENDING	4.6	-14.8	4.7	+2.2	5.1	+8.5
TOTAL USE	127.0	+1.4	126.0	-0.8	127.6	+1.3
USDA REMOVALS	14.3	+10.9	17.0	+18.9	15.1	-11.1

Ben W. Huang, Agricultural Economist

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Washington, D.C.

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The fruit industry expects substantially smaller supplies of noncitrus fruit this year because of the adverse weather last winter and spring. However, increased production can be expected in the years ahead as the bearing acreage for noncitrus fruit continues to increase. In contrast, this season's citrus crop is projected to be moderately larger than last season. With the improved economy, demand should be brighter than last season. Consequently, even with larger citrus supplies, good demand should hold prices relatively firm. Prices for some canning fruits were negotiated at the same levels as a year ago, but others are higher. Overall, grower returns will increase moderately and the fruit industry will have another profitable year.

The moderate rate of increase in costs of marketing and larger supplies of apples and oranges have resulted in slightly lower retail prices of fresh fruit so far this year than a year ago. Retail prices of fresh fruit are likely to decline seasonally but at a slower rate than in the previous year because of the sharply reduced Navel orange crop in California. Consequently, retail prices will average slightly above a year ago through this winter. According to the U.S. Department of Agriculture, labor costs for food retailing have risen only 4 percent from a year earlier. Transportation rates, a major component of fresh fruit marketing costs, have advanced only slightly. Including all other items, the index of food marketing costs rose 2.9 percent this year to 343.9 (1967=100) in August, compared with 334.4 a year earlier. During the 1983-84 season, supplies of most fruit should be adequate in supermarkets and consumers will pay only moderately higher prices.

#### GENERAL PRICE OUTLOOK

The index of prices received by growers for fresh and processing fruit through the third quarter this year has averaged 28 percent below last year. The September index declined to 107 (1977=100), off a third from August and nearly two-thirds below a year ago. Lower prices were indicated for oranges, grapefruit, lemons, and peaches, but prices were higher for apples, pears, and strawberries. However, orange prices may strengthen somewhat from the current depressed levels because of a sharply smaller California navel orange crop. Apple prices are expected to decline when larger supplies become available. As a result, the index of prices received by growers for fresh and processing fruits this fall and early winter is expected to average only slightly below a year ago.

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Table 1.--Index of quarterly prices received by growers  
for fresh and processing fruit, 1980-84

Year	1st	2nd	3rd	4th	Annual average
(1977=100)					
1980	125	131	120	126	126
1981	123	127	125	142	142
1982	145	157	223	176	175
1983	129	123	125	<u>1/148</u>	<u>1/131</u>
1984 <u>1/</u>	144	145	165	125	<u>145</u>

1/ Estimated.

SOURCE: Crop Reporting Board, USDA.

During 1983, retail prices of fresh fruit have steadily advanced, but remained below year-earlier levels. The August BLS index of consumer prices for fresh fruit stood at 328.9 (1967=100), up 0.7 percent from July, but still 2.1 percent lower than a year ago. The lower consumer price index for fresh fruit was attributed to plentiful supplies of apples and oranges and a relatively small rise in costs of marketing. Prices are expected to decline seasonally this fall and early winter, but average higher during 1984.

Table 2.--Quarterly Consumer Price Index for fresh fruit, 1980-84

Year	1st	2nd	3rd	4th	Annual average
(1967=100)					
1980	238	265	290	261	264
1981	256	276	302	279	278
1982	289	322	333	294	310
1983	274	301	<u>1/328</u>	<u>1/310</u>	<u>1/303</u>
1984 <u>1/</u>	290	320	<u>340</u>	<u>300</u>	<u>313</u>

1/ Estimated.

SOURCE: Bureau of Labor Statistics.

Retail prices of processed fruit have averaged slightly above a year ago, primarily reflecting increased prices for canned fruit juice. Packers recently announced price hikes for canned fruit--peaches, pears, and fruit cocktail--so, retail prices of processed fruit are likely to remain firm during 1984.

Table 3.--Quarterly Consumer Price Index for processed fruit, 1980-84

Year	1st	2nd	3rd	4th	Annual average
(Dec. 1977=100)					
1980	123	125	127	129	126
1981	134	142	143	145	141
1982	148	148	149	150	149
1983	151	150	1/ 151	1/ 152	1/ 151
1984 1/	153	154	154	155	154

1/ Estimated.

SOURCE: Bureau of Labor Statistics.

#### Fresh Citrus Fruit

The October 1 crop estimate for 1983/84, excluding California "other areas" grapefruit, indicates a citrus crop of 14 million tons, almost 5 percent more than last season and 17 percent above 1981/82. Larger crops are estimated for grapefruit, lemons, oranges, and tangerines, while smaller crops are indicated for limes, tangelos, and Temples.

Table 4.--U.S. citrus fruit production: 1981/82, 1982/83 and indicated 1983/84

Crop	1981/82	1982/83	1983/84
1,000 short tons			
Oranges	7,600	9,406	9,631
Grapefruit	2,873	2,447	1/ 2,619
Lemons	942	947	1,064
Limes	52	68	60
Tangelos	229	171	144
Tangerines	212	220	247
Temples	144	211	203
Total	12,052	13,470	1/ 13,968

1/ Excludes California grapefruit in "other areas."

SOURCE: Crop Production, SRS, USDA.

## Oranges

The first forecast for the 1983/84 orange crop is 223 million boxes, up slightly from last season, but 26 percent above 1981/82. The increase is entirely attributed to a sharply larger crop in Florida. The forecast for production of all oranges in Florida is 168 million boxes, a fifth above last season. Production of early and mid-season varieties at 94 million boxes, is more than a third larger, while that of Valencias is projected to total 74 million, 7 percent more. At 46 million boxes, the California crop is 37 percent less than last season, a tenth above 1981/82. However, very large fruit sizes are expected in California. All orange production in Texas is estimated at 5.3 million boxes, down 7 percent. Arizona growers expect to harvest 3.2 million boxes, 16 percent below last season.

Fresh orange prices at both farm and retail levels so far have been well below a year ago. The September on-tree returns for fresh oranges averaged \$3.12 a box, compared with \$22.12 a year ago. However, fresh orange prices will strengthen from the current depressed levels. Sharply smaller supplies of California navel oranges will push up prices significantly. Current prospects through the winter point to average grower prices near last year's levels. Consequently, retail prices will also advance from the current low levels.

Because of lower prices, exports of U.S. oranges so far have been well above a year ago. The increases were recorded for all major importing countries with the West European market recording nearly a four fold increase. Canada, our leading customer, also has purchased a significantly larger quantity of our oranges. However, shipments to Hong Kong and Japan, our principal markets, have only recorded small increases. With the sharply reduced output of California oranges, prospects for U.S. exports of fresh oranges will diminish during the 1983/84 season.

## Grapefruit

The October 1 forecast for 1983/84 grapefruit production (including, for California, only desert valley fruit) points to a crop of 63.9 million boxes, 11 percent more than last season, but 6 percent below the 1981/82 crop. Larger crops are indicated for all producing areas except Arizona. Florida's grapefruit forecast of 46 million boxes is 17 percent more than last season's crop. Texas growers expect to harvest 11.5 million boxes, 3 percent more than last season. California "Desert area" is projected at 4.2 million boxes, 2 percent above the preceding season. Arizona growers are likely to harvest 19 percent less.

Florida's grapefruit crop is maturing later than normal this year and thus, shipments from Florida through early October were well below last year's levels. Consequently, opening f.o.b. prices were sharply higher than a year ago. Prices are expected to decline when larger supplies become available. Carryover stocks of most processed grapefruit products are down substantially going into the 1983/84 season so processor demand is expected to be strong this season. In addition, demand for processed products is likely to rise. Export markets are likely to remain bright in view of the continued expanding economy abroad. Thus, even with a larger crop, good demand will moderate any price declines.



## Lemons

The Arizona-California lemon crop (tree crop available for harvest) is estimated at 28 million boxes, 12 percent more than the crop harvested during 1982/83. California's crop, at 21.5 million boxes, is 8 percent larger. A crop of 6.5 million boxes is expected in Arizona, 29 percent above the utilized production in 1982/83.

Total shipments of lemons through early October were slightly behind last season's pace, chiefly reflecting substantially reduced processing use. Deliveries to domestic fresh markets were also down slightly, while exports showed good gains. Despite a larger crop, f.o.b. prices for fresh lemons so far have averaged moderately higher than a year earlier. Prices are expected to fall this winter when larger supplies become available.

## PROCESSED CITRUS FRUIT

The quantity of the 1982/83 citrus crop used for processing was up from the previous season. However, the proportion decreased from 70 to 65 percent, with all three principal citrus fruit showing declines.

A substantially larger Florida crop boosted the quantity of oranges used for processing. Approximately 115 million boxes of oranges--including tangelos, Temples, tangerines, and K-early citrus--were used for frozen concentrated orange juice (FCOJ) in 1982/83. This combined with the higher juice yield resulted in 169.6 million gallons of FCOJ packed in Florida, up 27 percent from 1981/82. However, because of the significantly smaller carryin stocks and reduced imports, the total supply of FCOJ is still slightly below the level of 1981/82.

In response to the sluggish demand, f.o.b. prices for FCOJ remained steady at \$3.95 a dozen 6-ounce cans, the same as a year earlier. Despite constant prices, sales are still lagging. Nevertheless, a total of 71 million gallons was in stock as of October 1, down slightly from a year ago. If the movement stays at the current pace, the carryover could approach 40 to 45 million gallons, compared with 53 million a year ago.

With a larger crop and a relatively high juice yield, the total pack of FCOJ in 1983/84 is expected to exceed last season's level. The first forecast of the 1983/84 juice yield is 1.43 gallons a box at 42.0 degree brix equivalent, compared with 1.48 for the 1982/83 crop. So, even with the smaller carryin stocks, the total supply of FCOJ could be heavy if imports remain relatively large. Demand is expected to rise as the economy continues to expand. Prices of FCOJ are expected to remain steady.

Reversing the downward trend, the total pack of chilled orange juice gained from the previous season. It amounted to 185 million gallons (excluding single-strength reprocessed), up 2 percent from 1981/82. The gain is primarily attributed to the increased tonnage of fresh oranges and a higher juice yield. As the economy has turned around, demand for chilled orange juice has risen slightly above last season. Nevertheless, yearend stocks were still well above a year earlier. The total pack of chilled orange juice will be up again during 1983/84, and demand for chilled orange juice will continue to rise. However, the ample supply could keep prices steady.



## Fresh Noncitrus

The 1983 noncitrus crop, including major tree fruits, grapes, and cranberries, is forecast at 12.2 million tons, 13 percent below last year primarily reflecting a sharply reduced grape crop, but still slightly above 1981. This summer's hot, dry weather dropped production forecasts for some fruit, such as apples, grapes, and peaches. Nevertheless, the apple crop is projected to be 2 percent larger than last year and supplies of winter pears will be up 9 percent. Consequently, available supplies of fresh noncitrus fruit this fall and winter will be adequate and prices should not rise appreciably.

Table 5.--U.S. noncitrus fruit: Total  
production, 1981, 1982, and indicated 1983

Crop	1981	1982	1983
	1,000 tons		
Apples	3,877	4,055	4,141
Apricots	89	113	105
Cherries, sweet	153	156	180
Cherries, tart	67	155	78
Cranberries	130	146	148
Grapes	4,458	6,616	4,931
Nectarines	182	173	190
Peaches	1,391	1,146	985
Pears	897	805	794
Prunes and plums	776	581	634
Total	12,020	13,946	12,186

SOURCE: Crop Production, SRS, USDA.

### Apples

The final forecast of the 1983 U.S. apple crop is 8.28 billion pounds, 2 percent above last year. The Eastern States expect to harvest 3.13 billion pounds, off 2 percent from last year. New York, the leading apple State in the region, expects 1.13 billion pounds, the same as a year ago. Prospects in the Central region point to a crop of 1.19 billion pounds, down 19 percent from 1982. A sharply smaller Michigan crop of 750 million pounds is chiefly responsible. In the Western region, prospects are for a crop of 3.96 billion pounds, 15 percent above 1982. Washington, the leading apple-producing State in the Nation expects 3 billion pounds, up 15 percent. California apple growers also expect to harvest 8 percent more than in 1982.

Shipments of fresh apples are running well ahead of last year's pace and demand is generally good. F.o.b. prices for fresh apples at major shipping points showed a mixed pattern, with strong prices in the central and eastern regions and lower prices in the West. However, with increased shipments, prices have declined from the high levels early in the season. Prices are expected to weaken further as supplies will continue to increase this fall and winter. However, the sharply reduced navel orange crop in California and good export prospects may moderate price declines. The smaller crops in the East and Central regions have kept prices for processing apples firm. Prices for processing apples have been negotiated at levels moderately higher than last year. Processor demand for this year's apples could be strong as the carryover stocks of canned apples and apple juice are moderately below last year's levels. Movement of canned apples and apple juice has been very strong. Good movement will encourage packers to process a large quantity of apples.

### Grapes

The final forecast for the U.S. grape crop is 4.93 million tons, 25 percent less than last year. Prospects in California point to a crop of 4.37 million tons, 29 percent below last year, with significantly smaller crops expected for all three types--table, wine, and raisin grapes.

Mixed production is forecast in other States, but the total is 17 percent larger, with production up in all of the principal States. Washington, the second largest grape-producing State in the Nation, expects a record crop--27 percent larger. New York, Michigan, and Pennsylvania all report excellent crops. The New York grape forecast, 185,000 tons, is 18 percent above last year; Michigan, 60,000 tons, up 3 percent; Pennsylvania, 57,000 tons, up 21 percent.

Because of a smaller crop, shipments of fresh table grapes were running slightly behind last year's pace. Despite the smaller crop, f.o.b. prices were generally weak early in the season, but have recently strengthened. By October 3, Ribers were quoted at \$10.00 a 23-pound lug in Central San Joaquin Valley, California, compared with \$8.50 a year earlier. F.o.b. prices for fresh table grapes are expected to remain firm throughout the season because of the seasonally declining supplies. Despite a smaller raisin variety crop, the field price for natural seedless raisins has been negotiated at a minimum \$1,300 a ton, the same as last season. However, reduced growth in wine shipments and a sharply larger inventory have lowered grower prices for wine variety grapes well below a year ago. Prices vary greatly by producing areas, supplies, and varieties of grapes. Sluggish shipments have also resulted in steady wine prices. The BLS September producer price index for all wines stood at 259.6 (1967=100), almost the same as a year ago. The large inventory, lower grape prices paid by wineries, and slower rate of increase in demand may weaken wine prices somewhat.

## Pears

The final forecast of the 1982 U.S. pear crop is 794,000 tons, 1 percent less than the 1981 crop. The decrease is attributed to the smaller output of Bartlett pears in Pacific Coast States, while production of pears other than Bartletts is up 9 percent. Because of the scab, shipments of Bartletts for fresh market were sharply below a year earlier. As a result, the f.o.b. prices for Bartletts were generally higher than last year. However, with a larger output, prices of winter pears may weaken somewhat. Furthermore, larger supplies of apples could also exert some additional downward pressure on winter pear prices.

In response to the slack demand for Bartletts from packers, West Coast growers and canners agreed on a field price of \$135 a ton, the same as last season. The smaller Bartlett crop resulted in a reduced pack of canned pears. So, this combined with the depleted carryin stocks, total supplies of canned pears will be tight. Consequently, packers have announced price hikes which will be reflected in higher retail prices of canned pears.

## PROCESSED NONCITRUS

This season's pack of most canned fruit, particularly peaches, pears, and fruit cocktail, will be less than a year ago. The smaller pack combined with depleted stocks will result in tight supplies of canned fruit. Consequently, prices are expected to strengthen as reflected by the recent price hikes announced by packers. Reflecting smaller crops of tart cherries and strawberries, supplies of frozen fruit and berries will be down, and prices will be firm. Supplies of raisins are likely to be heavy as a result of larger carryin stocks and increased production. In contrast, because of substantially reduced carryin stocks, supplies of dried prunes will be moderately less than last season but adequate to meet market need. Prices of dried fruit are not expected to rise appreciably.

Although the packing season is not over, the 1983/84 pack of most canned fruit is expected to be smaller than last season. The unaudited pack for the 1983 Clingstone peaches totaled 10.9 million cases (24-2-1/2 basis), the smallest since 1940. The pack of canned apricots is 28 percent smaller. Based on the quantity delivered to packers, the canned Bartlett pack will be down from last year's level. With smaller crops of Cling peaches and Bartletts, the pack of fruit cocktail is 8 percent smaller. The canned cherry pack shows a mixed performance on the basis of cherries used for canning. The quantity of tart cherries used for canning were slightly less than half of last year's, while that of sweet cherries was up slightly. Demand for canned apple products has been good and resulted in reduced stocks of canned apples and apple juice. The total pack may not gain very much because supplies of processing apples could be short from several important producing States in the Central and East regions. However, trade sources indicate that processors are likely to pack more canned apple products than last season.



Reflecting tight supplies for most canned fruit, prices have strengthened. The September 1983 producer price index for canned fruit stood at 254.5 (1967=100), up slightly from August and 4 percent from a year earlier. Demand prospects for canned fruit may be somewhat brighter with the stronger economy. Thus, reduced supplies and improved demand will keep canned fruit prices firm during 1983/84.

Despite a smaller grape crop, delivery of raisins to handlers so far has been significantly heavier than last year. At present, the trade is forecasting a total production of 363,000 tons of raisins. With a larger carryin stock, the total supply of raisins will be heavy during the upcoming year. Even though demand may pick up somewhat in light of the improved economy, the heavy supplies are likely to keep prices relatively steady. The BLS August producer price index was 449.5 (1967=100), slightly above a year ago.

Production of dried prunes, the other major fruit item is currently estimated at 129,600 tons (natural condition), up 5 percent from 1982. Because of the sharply reduced carryin stocks, the total supply of dried prunes will still be moderately smaller. Prune shipments got off to a sluggish start with both domestic and foreign markets showing declines. Even with a moderately smaller supply, prices are not expected to rise appreciably. The August BLS producer price index, at 281.7 (1967=100), remained unchanged from a year ago.

The 1983 pack of frozen fruit and berries will vary this season. Supplies of frozen tart cherries will be tight, reflecting a sharply reduced pack. Frozen strawberries, with a relatively large pack and increased imports from Mexico will be adequate for market demand. Deliveries of blueberries and blackberries to freezers increased significantly over last season, while those of red raspberries fell. An expanding economy may raise demand somewhat, but prices are not expected to advance appreciably.

#### Tree Nuts

Supplies of tree nuts will be adequate for market needs during 1983/84 despite sharply reduced crops of almonds and walnuts. This season's filbert crop is also expected to be significantly smaller than last season, but the pecan crop is likely to be sharply larger.

The 1983 California almond crop was forecast at 250 million pounds, shelled basis, 28 percent less than 1982 and 39 percent below the 1981 record crop. Despite the smaller output, the total supply of almonds is likely to be adequate because of the larger carryin stocks. Domestic demand looks bright in light of the improved economy. Foreign markets are not likely to be very encouraging even though export shipments could improve somewhat. Export prospects will be influenced by the strength of the dollar and the world economy. However, Spain, the world's second largest almond producer, expects a crop of 35,000 tons, down 36 percent from last year. The smaller Spanish almond crop will strengthen demand for U.S. almonds in Western Europe. On the other hand, demand for almonds will also be affected by the degree of substitution between almonds and filberts. A sharply larger Turkish filbert



crop may discourage our almond shipments to Western Europe. Shipments this season through August were down almost 4 percent from a year ago, entirely reflecting a 13-percent decrease in export shipments. Smaller exports were caused by sharply reduced purchases from Western Europe, while other areas generally showed gains. Opening prices for almonds were significantly higher than a year ago. Because of the lower outturn, grower prices for almonds are expected to average above the 1982 rate of 93 cents a pound (kernel weight).

With a sharply reduced crop and good demand prospects, it is likely that walnut prices will remain strong this year. Shipments of walnuts got off to a good start this year. Exports were well above a year earlier and domestic shipments, which account for the lion's share of the market, gained moderately. Also, a sharply reduced crop in France could further strengthen our market in Western Europe.

A sharply smaller filbert crop is expected in Oregon and Washington this year. However, world production of filberts is expected to be 49 percent above 1982. Turkey, the leading producer, expects a record crop of 370,000 tons, up 85 percent from last year's output. Turkey will continue to dominate the world market for filberts. Spanish production will also likely be up 80 percent over 1982, while Italian production will be off 9 percent. With huge supplies in the world, filbert prices received by growers are expected to fall from last year's high levels.

Carryover stocks of pecans at the beginning of the season were heavy. This combined with a sharply larger crop will boost total supplies of pecans. Large supplies should weaken grower prices, but smaller crops of other tree nuts could moderate price declines somewhat.

#### Per Capita Fruit Consumption

In 1982, total per capita consumption of fruit was estimated at 215.1 pounds (fresh weight equivalent), compared with 222.1 pounds in 1981. The 1982 estimate reflects the discontinuation of data on processed pineapple products. So, with the exclusion of processed pineapple products from the 1981 per capita calculation, the 1982 consumption rose slightly from 1981. The increase was primarily attributed to a greater interest in frozen concentrated citrus juice.

The 1982 per capita fresh fruit consumption was estimated at 85.7 pounds, down slightly from 1981. Each person consumed approximately 1 pound less of fresh noncitrus fruit for an average of 60.9 pounds. Bananas remained the most popular fruit, with 22.6 pounds consumed per person in 1982, up moderately from 1981. Apples ranked second at 17.9 pounds per capita, up 1.1 pounds from 1981. The rise in apple consumption was largely due to the ample supply in 1982. Consumption of fresh strawberries, grapes, pears, cranberries, and pineapples was also greater than in 1981, primarily because of increased production.

The 1982 freeze in Florida and the smaller California orange production resulted in decreased fresh citrus consumption. In 1982, 24.8 pounds of fresh citrus were eaten per person, compared with 25.0 pounds in 1981. Consumption of oranges, tangelos, and limes fell, while consumption of tangerines and lemons remained unchanged. Only grapefruit, at 7.6 pounds per person, showed an increase, because this crop was relatively unharmed by the cold snap.

The per capita canned fruit consumption at 13 pounds showed a 3-percent decrease from 1981. Canned noncitrus fruit, which formed the bulk of all canned fruit, was largely responsible for this drop. However, per capita consumption of both canned peaches and pears showed increases of 2.8 and 12.5 percent, respectively, over 1981, and were the only canned fruit items to post any gains.

Canned and chilled fruit juice consumption showed a marked decrease, due primarily to sharply reduced purchases of citrus juice. The reduced consumption was caused by the competition from lower-priced frozen juices. In contrast, the 1982 consumption of canned noncitrus juice advanced 4 percent from 1981 (excluding canned pineapple juice for both years). The gain was entirely due to the substantial increase in canned apple juice consumption.

Consumption of dried fruit advanced slightly in 1982, rising to 2.76 pounds per person, compare with 2.71 a year earlier. Raisins remained the leading item at 62 percent of the total. Likewise, per capita consumption of frozen fruit also rose slightly to 2.97 pounds, compared with 2.92 pounds in 1981.

Frozen citrus showed a good gain in per capita consumption--11.11 pounds, compared with 9.76 in 1981 with most juices showing increases. Reflecting lower prices, FCOJ registered a 10 percent increase in its per capita use, while frozen concentrated grapefruit juice (FCGJ) consumption rose 11 percent.

Table 6.--Per capita fruit consumption, 1979-83

Year	Total	Fresh	Canned <u>1/</u>	Chilled <u>1/</u>	Frozen <u>1/</u>	Dried
Pounds, fresh weight equivalent						
1979	219.6	83.9	49.3	11.5	65.2	9.7
1980	225.3	89.8	48.4	12.3	65.8	9.0
1981	222.1	86.8	51.4	8.7	64.9	10.3
1982 <u>2/</u>	215.1	85.7	<u>3/</u> 38.0	7.1	73.8	10.5
1983 <u>4/</u>	216.8	86.4	<u>3/</u> 37.8	8.4	73.5	10.7

1/ Canned, chilled, and frozen includes fruit and juice.

2/ Preliminary. 3/ Excludes pineapple products. 4/ Estimated.

SOURCE: Economic Research Service, USDA.

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### Overview

#### Higher Vegetable Prices In Prospect

Through mid-1984, prices of most vegetables and vegetable crops will average above the previous year's relatively low levels. Increased consumer demand because of the economic recovery and reduced supplies of some items will push prices up.

The economic recovery has pushed up 1983 demand for food. The physical quantity of grocery store sales through August was up moderately, while sales by eating and drinking places posted even more robust gains. Vegetables, especially fresh, shared in the increased food demand. Also, strong restaurant sales boosted the gain in disappearance of frozen potato products during first-half 1983. Use of fresh potatoes and other processed vegetables has also risen.

Next year's economic growth is forecast to top 1983, although the year-to-year gain in 1984 masks a quarterly pattern of decelerating recovery. Nevertheless, these gains portend a modest and gradual strengthening of demand for agricultural products through 1984.

Higher inflation and interest rates are also forecast for 1984, which would partially offset the higher prices and cash returns to farmers because of the strengthened demand. In addition, increased inflation could further boost retail prices because of its effects on marketing costs. Those costs account for about 70 percent of the retail value of fresh vegetables and about 80 percent of processed.

#### Drought Has Small Impact On Total Supplies

Weather in 1983 has been one of extremes, with El Nino causing a wet, cool spring that disrupted spring fresh vegetable supplies and delayed planting of summer crops in many areas. Then the worst drought in more than 50 years reduced production in many areas of the Southeast, Northeast, and Midwest. However, the cumulative impact of this year's aberrant weather on total vegetable supplies has been relatively small. With respect to fresh vegetables, the droughts' effects were blunted because of the large volumes produced in California, while the scattered nature of potato production limited the drop in the fall crop. However, the weather did contribute to the reduced output of sweetpotatoes, production of which is concentrated in the Southeast. In addition, the drought added to the lower production of processing vegetables in the Midwest, but generally higher carryover stocks will ensure adequate supplies for most items through the 1983/84 season.

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The 1984 weather outlook is, of course, uncertain. But nearly every year a major climatic event influences production. Examples include Florida freezes, El Nino, and drought. However, the heavy spring rains and big 1983 snowpack in the Western States ensure adequate water for irrigation needs in that region.

### Consumption Trends and Highlights

Total per capita consumption of vegetables during 1982 totaled 220.9 pounds (farm-weight equivalent, excluding potatoes and sweetpotatoes), compared with 214.8 in 1981 and 212.9 in 1972. Fresh consumption propelled the gain in 1982, which was 10 pounds more than in 1972 and the highest since 1952. Dietary concerns and the mass-adoption of salad bars by restaurants have spurred the gain in consumption. This year's consumption may decline slightly because of production setbacks, although larger imports may be partially offsetting.

Canned consumption is apparently losing out to fresh. Although 1982 consumption, at 47.9 pounds per person (product weight) was up slightly from 1981, it totaled 8 pounds less than in 1972. Almost all of the vegetables used as side dish items have declined, partly because of concern for salt intake, but also because Americans now consume fewer dishes per meal while frozen french fries have heavily replaced processed vegetables in the restaurant trade. Tomatoes and tomato products have typically maintained their mid-1970's consumption levels because of the popularity of Italian, Mexican, and other ethnic foods. Consumption for 1983 may increase slightly because of gains for tomatoes and tomato products.

Frozen vegetable consumption has grown only slowly over time. Increased use of broccoli and sweet corn have provided most of the growth in recent years. This year's consumption will probably post a strong gain, as large supplies and steady prices have encouraged use.

The recent trends in consumer preferences and most scientific research and dietary guidelines seem to favor more fresh consumption at the expense of processed. These factors, however, have spurred the processed industry into action. The National Frozen Vegetable Council has been formed by some processors to promote its products, while the Wisconsin Canned Vegetable Council has hired a new agency to promote the virtues of private label canned vegetables. Furthermore, a special advertising supplement (reviewed and approved by the American Dietetic Association) in a recent Time magazine attempted to debunk some supposed myths about the nutrition value of processed vegetables.

Per capita consumption of potatoes during 1982 totaled 114.4 pounds (fresh-weight equivalent), up from 112.9 in 1981, but still about 4 pounds less than the 1973-82 average. Fresh use rose to 48.6 pounds from 1981's alltime low, while processed use rose slightly. A strong gain in consumption of potato chips with smaller rises in dehydrated and canned products offset the slight decline in frozen potato product usage to boost the processed total. For 1983, both fresh and processed potato consumption will likely rise.



Since 1960, the proportion of fresh consumption to the total has declined from over 75 percent to 42 percent in 1981 and 1982. This reflects increased away from home consumption and demand for convenience foods that has occurred because of higher real incomes and the increase of women in the labor force. Frozen potato product consumption has gained the most from this change, which in turn was aided by the advent and maturity of fast-food restaurants. Although the product weight of per capita potato consumption has declined, the fresh-weight equivalent has risen.

Among other crops, consumption of sweetpotatoes has displayed no discernible trend over the past decade, while the use of pulses has declined. Mushroom consumption has been rising because of the popularity of the fresh form.

### Commodity Outlook

#### Fresh Vegetables

Production of fresh vegetables and melons during 1983 will likely fall slightly from last year's record output. Increased production during the winter and summer quarters will partially offset the declines in spring and fall output. A substantial drop in onion production contributed the most to the decline.

The depressed grower and retail prices of second-half 1982 carried into early 1983. But the wet spring weather in the major supply areas reduced supplies and boosted prices sharply from a year earlier. Summer shipments of fresh vegetables rose from a year ago, but grower and retail prices also gained substantially. The concomitant rises in vegetable supplies and prices suggest that higher consumer income because of the economic recovery has strongly increased the demand for fresh vegetables and probably contributed the most to the higher prices. This year's weather patterns may have also reduced home garden output, creating extra demand for commercially-produced vegetables.

For all of 1983, the grower price index for fresh vegetables will average about 6 percent higher than in 1982, while the retail price index will rise about 4 percent.

For 1984, the supply and demand factors point to likely gains in supplies and consumption of fresh vegetables, and a rise of 5 to 10 percent in both grower and retail prices. In brief, the following will affect the supply, demand, and prices of fresh vegetables during 1984:

- ° Consumers' income--Consumers' incomes and consumption expenditures are expected to rise more than in 1983. This could continue the strong fresh vegetable demand that has characterized second-half 1983 and buoy 1984 grower and retail prices.

- ° Tastes and preferences--The trend toward larger fresh vegetable consumption does not yet appear to have ended. Recent scientific research and dietary guidelines favor fresh. Also, restaurants continue to add salad bars, and promote them as well. The nation's leading fast-food chain, one of the last bastions of "non-salad bar" restaurants, is now test marketing salad bars. Also, many retail grocery stores are now offering salad bars.

° Imports--Larger Mexican acreage and the peso/dollar exchange rate will likely favor Mexican shipments into the U.S. during first-half 1984 at levels somewhat greater than in 1983.

° Weather--Weather always plays a primary role in determining supplies.

° Pests--A recurrence of a whitefly infestation in the desert production areas of California and Arizona could disrupt early 1984 lettuce supplies.

° Marketing costs--In general, marketing cost increases tend to follow the rate of inflation, which is expected to increase slightly next year. Railroads have reemphasized piggyback transportation of fresh produce. This competition with trucks could temper transportation cost rises next year.

° Past price trends--Over time, the rate of inflation has explained well over 90 percent of the annual variation in fresh vegetable prices.

### Processed Vegetables

This year's contract production of four major processing vegetables (snap beans, sweet corn, green peas, and tomatoes) fell 9 percent from 1982. Production of all four crops declined. With respect to the side-dish items (beans, corn, and peas), processors, especially freezers, contracted for fewer acres this year because of large 1982/83 supplies, while this year's damp spring and the summer drought contributed to lower yields. Total output of the three crops dropped 18 percent. Although tomato processors had actually raised their 1983 contract tonnage, early and late season rains reduced yields from 1982's record-highs to leave total contract production at 6.8 million tons, compared with 7.1 million in 1982. The wet spring also cut back on the production of broccoli and spinach, but broccoli production and frozen stocks have recovered.

The reduced production of processing vegetables will translate into smaller packs for most items and leave total 1983/84 supplies down from 1982/83. Increased carryover stocks will mitigate the effects of the reduced packs, though.

Canned supplies will decline the most because of sharp reductions in the three major side-dish items--snap beans, sweet corn, and green peas. This year's combined pack of those items will likely total 110 to 120 million cases (basis 24/303), compared with 133.2 in 1982, and the lowest total since 1964. However, because of lower combined carryin stocks, the drop in total supplies of the three items will be greater than the pack decreases. Supplies of canned tomatoes, tomato juice, beets, carrots, and sauerkraut should approach last year's because of higher carryin holdings. Overall, 1983/84 canned supplies will total 6 to 10 percent less than in 1982/83.

Total frozen supplies for 1983/84 will decline only slightly from 1982/83's alltime high, largely because of a 75 percent rise in the carryover. Despite the substantial decline in the packs, 1983/84 supplies will likely fall only 2 to 4 percent from 1982/83, and be about 15 percent above the average for the previous five years. The combined supplies of snap beans, sweet corn, and green peas will be down by a similar percentage as the total.

Despite the reduced processed vegetable supplies for 1983/84, sharp runups of the leading price indexes are unlikely for several reasons. The large frozen vegetable supplies should continue the pattern of stable prices well into 1984 for most frozen items that has prevailed since fall 1982. In addition, the relatively ample stocks of most canned vegetables, especially tomatoes and tomato products will limit price rises. Even though the combined supply of canned beans, corn, and peas will be the smallest in recent memory, per person use of these items has declined in the past decade, which could temper price gains of these items. Also, there may be some substitution of frozen and/or fresh vegetables for those canned items in short supply. Finally, the farm value of most processing vegetables probably declined this year. This, combined with slower rises in marketing costs that accompanies reduced inflation, will ease some of the upward pressure on processed vegetable prices.

For all of 1983, the retail price index for processed vegetables will average about 1 percent higher than in 1982, the smallest rise since the index declined in 1975. The index will probably post a rise of 5 to 9 percent in 1984.

## Potatoes

The 1983 fall potato crop is estimated at 293 million cwt, 5 percent less than a year ago. Low prices from the 1982 crop and a reduced contracting by some processors lowered acreage, while this year's average yield of 278 cwt is 5 cwt less than a year ago.

Substantial acreage and yield declines lowered the Eastern States output by 19 percent to the lowest regional total in recent memory. Maine barely retained its standing as the third leading producer, as its crop is the lowest since 1927. The Central States' production fell 2 percent, as larger production in the Dakotas did not offset acreage and weather affected cutbacks in other States. Although the Western States' crop declined slightly, their share of fall production rose to 65 percent. Average yields increased but were offset by lower acreage. Washington set a State and national yield record of 520 cwt per acre.

Through mid-1984, the smaller production will boost grower and product prices above year-earlier levels. In addition, demand will also likely support prices. Tablestock shipments have run ahead of a year earlier throughout 1983, including this summer when supplies were substantially less than last year and prices rose. Also, increased restaurant sales have apparently boosted frozen potato product demand. With the increased frozen product disappearance and reduced tonnage contracted for, processors may have to purchase larger quantities of potatoes on the open market, which would bid up prices. Finally, the decline in 1983 world potato production could mean larger exports of potatoes and/or potato production.

Grower prices for the 1983 crop will probably average \$5.25 to \$5.75 per cwt, compared with \$4.45 and \$5.41 in 1982 and 1981, respectively. Meanwhile, retail prices of fresh potatoes through spring 1984 will average about 25 percent higher than the relative lows of a year earlier. Frozen potato product prices, steady since mid-1982, will probably rise in the months ahead because of increased demand, reduced stocks, and increased raw product and cooking oil costs.



The reduced fall supplies and good grower prices should evoke a rise in 1984 spring and summer crop plantings. Although those crops are only a small portion of total annual potato production, they are important in filling the supply gaps between the fall storage crops, and also when the storage supplies are short. Because of the strong 1983 prices and with frozen stocks likely to be significantly drawn down by next summer, 1984 fall crop acreage will also likely gain.

## Sweetpotatoes

The 1983 sweetpotato crop is placed at 11.1 million cwt, the second smallest on record and 22 percent less than last year. Growers responded to last season's low price by sharply reducing planted acreage to the lowest on record. In addition, the cool wet spring delayed planting and combined with this summer's hot and dry weather in the Southeast to lower the average yield to 114 cwt per acre, compared with last year's alltime high of 129 cwt.

Prices have moved up in response to the sharply reduced supplies. In September, growers received an average of \$11.10 per cwt, more than 50 percent higher than a year earlier and the highest ever for that month. Prices could rise contraseasonally during the fall months, and will continue to average sharply above a year earlier into mid-1984. For the 1983 crop, growers will likely receive an average \$13 to \$15 per cwt, compared with \$7.90 in 1982. Season prices achieved a record high of \$13.60 for the 1980 and 1981 crops.

In the recent past, a short crop has tended to prop up sweetpotato prices in the subsequent crop year. This has occurred primarily because the substantial crop reductions in 1977 and 1980 cut back canned sweetpotato packs and supplies, which in turn left 1977/78 and 1980/81 carryover stocks at about 8 percent of use, compared with the 10-year average of 24 percent. As a result, canners' efforts to build up stocks the year after the short crop maintained strong grower prices. However, like other canned vegetables, canned sweetpotato consumption has trailed off in recent years. Therefore, the stocks-to-use ratio at the end of 1983/84 likely won't dip as low as in 1977/78 and 1980/81, in which case, 1984 season prices may not match the expected 1983 season levels.

## Mushrooms

U.S. mushroom growers produced 491 million pounds in 1982/83, 5 percent less than the previous year's record high. However, the industry's structural change from a processing to a fresh market orientation continued. Fresh market output rose 6 percent and accounted for 69 percent of the total outturn, compared with 30 percent in 1972/73 and 48 percent in 1977/78. These industry patterns mirror increased domestic consumption of fresh vegetables and the competitive disadvantage of American canned processors relative to those in Asia.

In 1982/83, the average grower price rose to 88 cents a pound, a record. The higher average prices pushed the value of growers' sales to an alltime high of \$431 million. Of all the vegetable crops, only potatoes, lettuce, fresh-market tomatoes, and processing tomatoes are higher valued.



For 1983/84, growers intend to fill 140 million square feet of bed or tray area, up from 135 million in 1982/83. In addition, yields have climbed steadily in the past 20 years. These data suggest production this year could rise and approach the 1981/82 record production of 517 million pounds. The trend toward more fresh production will probably continue. If the higher output materializes, grower and retail prices of fresh mushrooms should continue to be fairly stable, as they have been in recent years. The larger, more efficient production facilities should also aid steady prices. Meanwhile, canned imports in 1983/84 will probably match or exceed a year earlier. As a result, processing grower prices, as well as wholesale and retail prices of canned mushrooms will also likely be steady in the coming year.

#### Dry Edible Beans

The 1983 dry bean crop totaled 15.5 million cwt, 38 percent less than last year and 52 percent lower than the record 1981 harvest. This year's outturn is the smallest since 1967. Lower grower prices for the 1982 crop forced a big planting decline. Reduced exports, in turn, pressured prices downward.

With tighter supplies, prices have moved up sharply. The September average grower price, at \$24.40 per cwt, stood 68 percent above last year's low level, and doubled the prevalent prices earlier in 1983. Given this year's much smaller crop, prices should remain buoyant through the 1983/84 marketing season. In addition, production shortfalls in other importing and exporting nations presage improved export potential in the coming year. However, the high value of the U.S. dollar, which further inflates prices to importing nations, could limit sales and temper price gains. The 1983 season average grower price will probably be from \$22 to \$28 per cwt, compared with \$13.80 in 1982--the lowest since 1972--and \$21.60 in 1981.

Table 1.--Grower and retail price indexes, 1980-84

Year	Grower Indexes		Retail Indexes	
	Commercial vegetables	Potatoes, Etc. <u>1/</u>	Fresh vegetables	Processed vegetables
	1977=100		1967=100	Dec. 1977=100
1980	113	129	242	118
1981	136	177	287	132
1982	127	125	288	139
1983	130	126	295	140
1984 <u>2/</u>	135	145	320	147

1/ Includes sweetpotatoes and dry edible beans. 2/ ERS forecast.

SOURCE: SRS and BLS.

Table 2.--Per capita consumption of vegetables (farm-weight equivalent)

Year	Fresh vegetables	Canned vegetables	Frozen vegetables	Fresh potatoes	Processed potatoes
	Pounds				
1962	101.3	83.7	16.0	77.5	29.7
1972	96.8	95.8	20.3	56.6	62.2
1980	107.1	88.9	21.1	55.8	61.9
1981	104.9	86.7	23.2	47.2	65.6
1982	109.4	89.6	21.9	48.6	65.8

SOURCE: ERS, USDA.

Table 3.--Processed vegetable supplies and disappearance, 1979/80-1983/84

Year	Canned <u>1/</u>		Frozen <u>1/</u>	
	Supply	Disappearance	Supply	Disappearance
	Million cases 24/303's		Million pounds	
1979/80	319	264	2,802	2,166
1980/81	303	254	2,546	2,123
1981/82	280	236	2,588	2,192
1982/83	289	239	2,947	2,252
1983/84	260-270		2,850-2,900	

1/ Eight leading items.

SOURCE: NFPA, AFFI, and SRS.

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## INTRODUCTION

This paper covers the current world situation and outlook for sugar and tropical products. Mr. Robert Barry and Mr. Alan Greditor follow with papers covering the domestic outlook for sweeteners and high fructose corn syrup (HFCS) competition, respectively. At our follow-up session we all will be available to answer questions. Mr. James Truran, Chief of the Sugar Group, Foreign Agricultural Service (FAS) will be the moderator of the follow-up session and will make informal remarks concerning the U.S. sugar import quota system as well as developments related to the recent UNCTAD sponsored negotiating conference on a new International Sugar Agreement.

In this paper, I would like to focus on world centrifugal sugar production, consumption, trade, sugar prices and stock levels. Summary analysis on the major tropical products (cocoa coffee and tea) are provided at the end of this paper by my colleagues Mr. Rex Dull and Mr. C. Milton Anderson. Recently published FAS circulars on cocoa, coffee and tea are available from our Information Division. The new FAS world sugar and molasses situation and outlook circular will be published November 9, 1983.

## WORLD SUGAR SITUATION

### Production

After two consecutive years of record breaking production levels, the outlook for the 1983/84 (September/August) season points to a sharp downturn in output. USDA's first estimate for world centrifugal sugar production in 1983/84, published October 26, places production at 94.66 million metric tons (raw value), 6.33 million tons below the revised 1982/83 output of 100.99 million tons. World production of sugar from cane is expected to account for 60.35 million tons and sugar from beets 34.31 million tons down 5 percent and 8 percent respectively, from the previous season. The decline in anticipated output reflects low world sugar prices which contributed to a reduction in sugarcane and sugar beet area, as well as poor growing conditions in several countries further reducing the production potential in both cane and beet producing areas.

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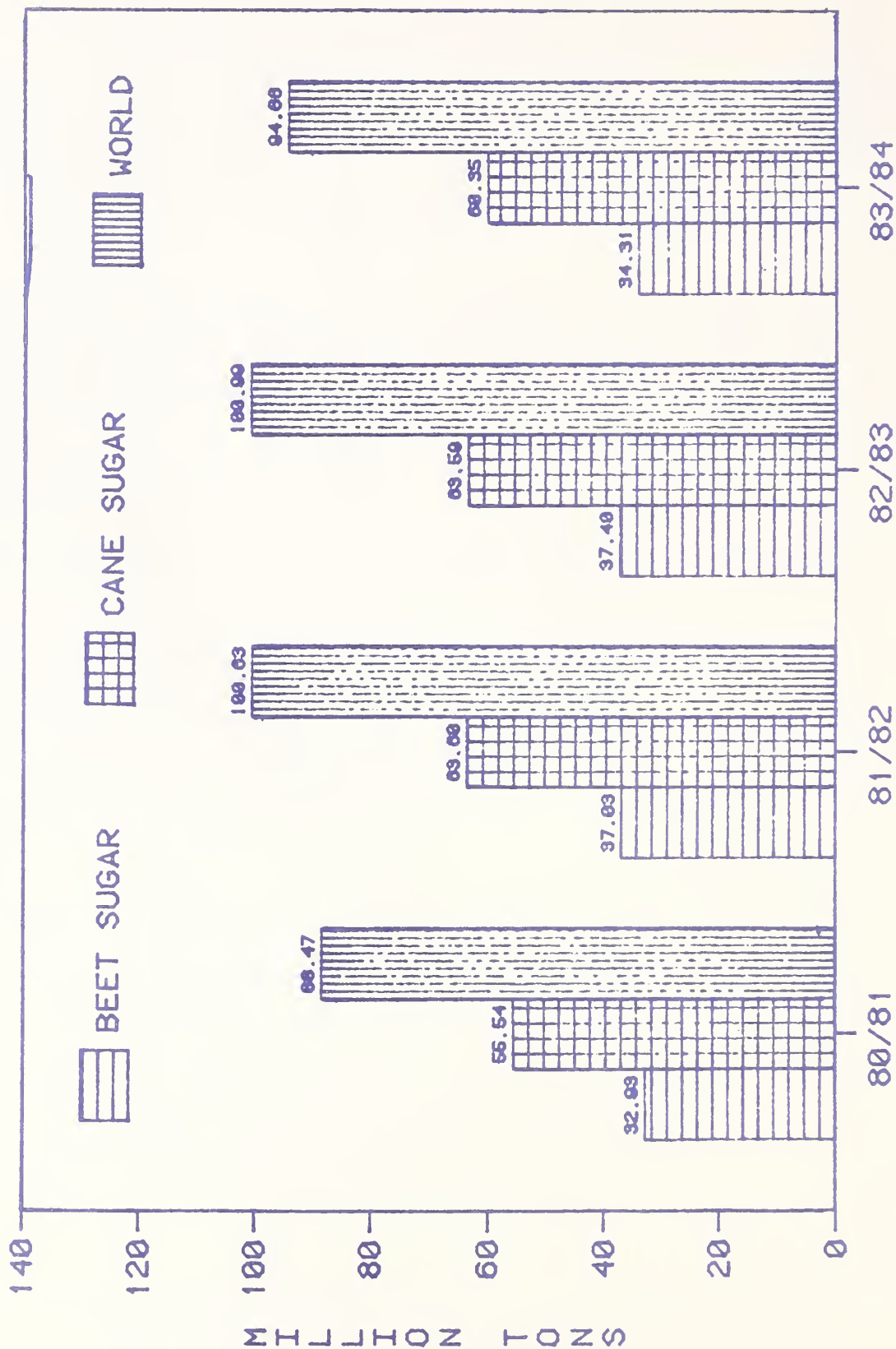
Cane sugar output for the 1983/84 season, representing 63.8 percent of the total world centrifugal production estimate, has been hit by adverse growing conditions in several major sugar producing and exporting countries. Australia suffered unfavorable conditions during much of the growing season resulting in a sharp decline in harvested cane tonnage. Australia's sugar output for 1983/84 is estimated at 3.00 million tons, down 15 percent from the previous season. South Africa's sugar production is expected to drop to 1.54 million tons, 32 percent below the 1982/83 output reflecting the devastating effects of a severe drought. The adverse effects of the recent drought in the Philippines is most severely affecting the 1983/84 crop, which is forecast at 2.28 million tons, 10 percent below output from the two previous years.

Thailand's sugar crop is also expected to be off sharply owing both to weather (e.g. early season moisture deficiencies) and depressed prices which induced shifts to alternative crops. In India, sugar production is expected to drop 11 percent from the record crops of the last two seasons. The decline in anticipated output largely reflects reduced harvested area as Indian farmers shifted sugar land into more remunerative crops.

The significant contraction in output in these key countries is partially offset by the prospect of improved or relatively stable conditions in such key cane sugar producing countries and regions as Cuba and the Dominican Republic in the Caribbean, all of Central American, and the largest producing countries in South America---Brazil, Argentina and Colombia.

In Asia, China, Indonesia and Pakistan are also expected to produce good crops. Particularly impressive has been the growth in China's cane as well as beet sugar output in recent years. China, spurred by a system of production incentives and investment in processing facilities which resulted in a doubling of sugar production between 1976/77 and 1982/83, is expected to produce a record 3.88 million tons this season.

# WORLD CENTRIFUGAL SUGAR PRODUCTION FOR 1980/81 - 1983/84



SUGAR PRODUCTION BY TYPE AND REGION  
1980/81 - 1982/84  
(Million metric tons)

Region	1980/81		1981/82		1982/83		1983/84	
	: Beet	: Cane	: Beet	: Cane	: Beet	: Cane	: Beet	: Cane
North America.....	2.96	5.02	3.20	5.35	2.59	5.91	2.58	5.64
Caribbean.....	0.00	9.36	0.00	10.06	0.00	9.00	0.00	9.35
Central America....	0.00	1.52	0.00	1.72	0.00	1.76	0.00	1.79
South America.....	0.30	13.28	0.19	13.23	0.28	14.04	0.35	14.04
European Community..	13.00	0.00	15.96	0.00	14.82	0.00	11.36	0.00
Other Western	:	:	:	:	:	:	:	:
Europe.....	1.98	0.02	2.18	0.02	2.45	0.02	2.21	0.02
Eastern Europe.....	4.76	0.00	5.86	0.00	6.06	0.00	5.81	0.00
USSR.....	7.17	0.00	6.41	0.00	7.39	0.00	8.50	0.00
North Africa.....	0.31	0.91	0.36	1.03	0.38	1.11	0.34	1.09
Other Africa.....	0.00	4.97	0.00	5.68	0.00	5.86	0.00	5.12
Middle East.....	1.19	0.08	1.64	0.08	2.01	0.10	1.84	0.10
Asia.....	1.26	16.61	1.23	22.36	1.42	21.76	1.33	19.92
Oceania.....	0.00	3.78	0.00	4.06	0.00	4.03	0.00	3.28
Total, by type.....	32.93	55.54	37.03	63.60	37.40	63.59	34.31	60.35
Total Centrifugal...	:	:	:	:	:	:	:	:
Sugar.....	88.47		100.63		100.99		94.66	

Turning to beet sugar production for 1983/84, prospects in key producing areas are mixed, but world-wide output is expected to dip to 34.31 million tons accounting for 36.2 percent of the projected world sugar crop. In the European Community (EC), beet sugar output; representing almost one-third of the world beet sugar crop, is expected to drop from 14.82 million tons to 11.36 million tons. Area harvested in the EC is estimated at 1.7 million hectares, 10 percent lower than the previous season. In addition, sugar yield per ton of beets is also expected to be lower owing to the generally adverse conditions under which the crop was produced (e.g. an unusually wet spring which hampered and delayed plantings followed by a very hot dry summer). Eastern Europe beet sugar output is also expected to be off somewhat from last year's excellent output due to as reductions in harvested acreage and less than optimal growing conditions in several countries.

In sharp contrast to the downturn in expected beet sugar output in the EC and Eastern Europe, sugar output in the Soviet Union for 1983/84 is forecasted at 8.5 million tons 15 percent higher than the estimated output for the previous year. Sugar beet production will likely be the highest in recent years as a result of excellent yields. In addition to increased tonnage, weather conditions in the USSR have favored a relatively high sugar content. A mild winter and early spring in the sugar beet region enabled Soviet farmers to plant beets during optimal seeding dates. Dry sunny fall weather to date has allowed for a harvest and transport under near ideal conditions.

While these are our best estimates, given current information, it must be remembered that the estimates are tentative. New information could force a shift up or down given developments over the next several months such as favorable or adverse conditions in beet areas in Europe and the Soviet Union as the harvest and processing season progresses and in the sub-tropics around the world where the 1983/84 sugar cane crop harvest and grinding season is concentrated November through June.

Sugar Production In Selected Major Producing Countries  
1982/83 Output Compared With 1983/84  
(Million metric tons)

Region/Country	1982/83	1983/84	Percent Change
Latin America.....			
Argentina.....	1.62	1.60	-1
Brazil.....	9.30	9.40	+1
Colombia.....	1.34	1.38	+3
Cuba.....	7.20	7.50	+4
Dominican Rep.....	1.20	1.20	---
Mexico.....	3.08	2.90	-6
Africa			
South Africa.....	2.26	1.54	-32
Oceania			
Australia.....	3.55	3.00	-15
Asia			
India.....	9.58	8.52	-11
Indonesia.....	1.57	1.58	+1
Philippines.....	2.52	2.28	-10
Thailand.....	2.21	1.70	-26
Cane Beet Sugar			
USA.....	5.30	5.19	-2
China.....	3.85	3.88	+1
Pakistan.....	1.29	1.39	+8
Spain.....	1.25	1.31	+5
Beet Sugar			
European Community:	14.82	11.38	-23
Eastern Europe.....	6.05	5.81	-4
USSR.....	7.39	8.50	+15



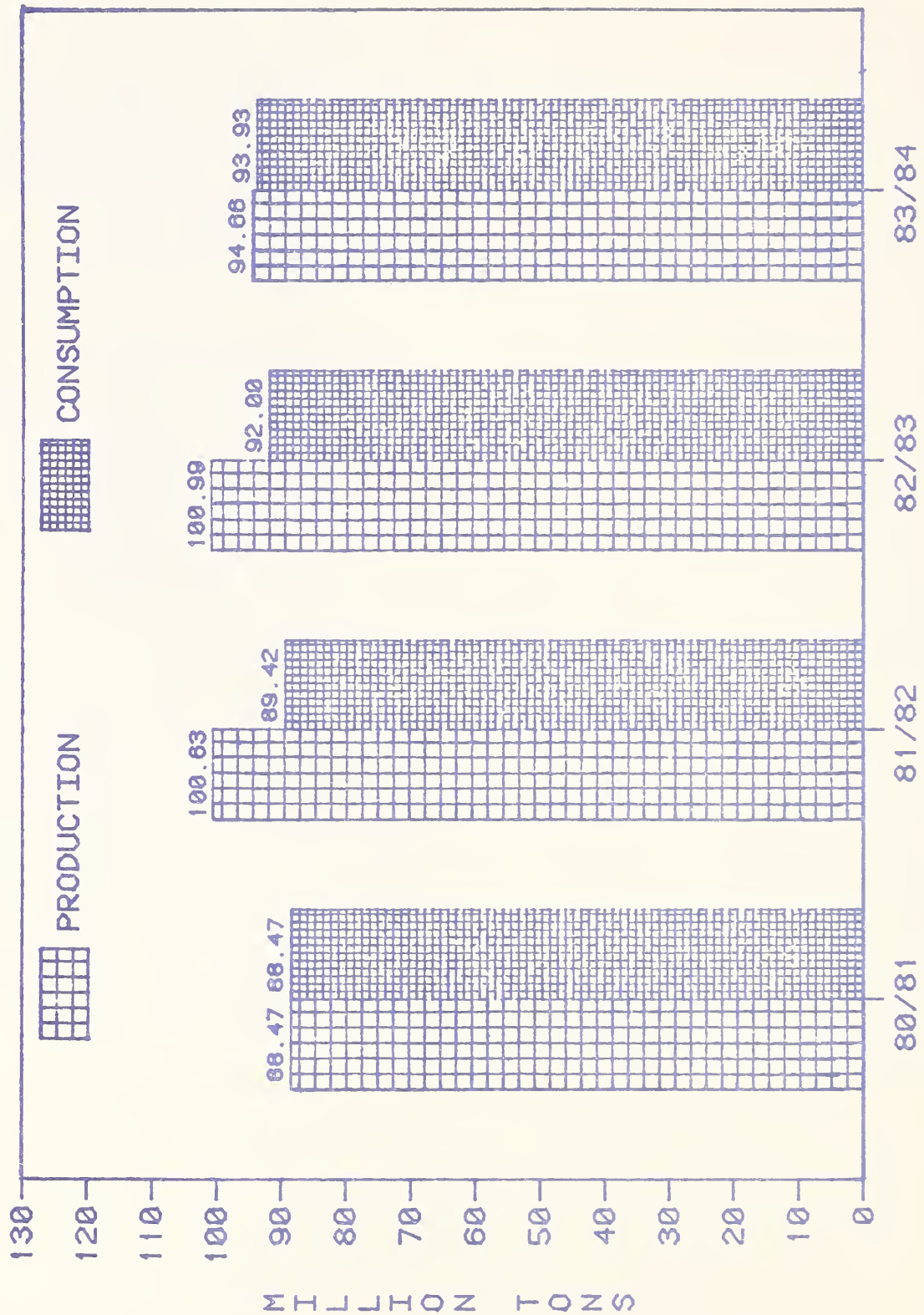
## Consumption

World centrifugal sugar consumption for 1983/84 is expected to advance 2 percent from the 1982/83 level currently estimated at 92.00 million tons. The anticipated growth in world sugar consumption is attributed to population increases, a continuation of relatively weak world prices fostering increased demand, projections for a modest recovery in the world economy and increased supply availabilities--especially in the large consuming nations in the developing world. The composition of the growth in anticipated sugar utilization, or lack of it in some regions of the world, is consistent with trends which have emerged over the last several years.

In many of the world's industrialized countries having high per capita consumption levels, the dominant share of sugar consumed is utilized indirectly in prepared foodstuffs and beverages. Over the past two years, the effects of the economic recession in the western world have dampened demand for sugar-containing products. With some improvement foreseen in the economies of Western Europe during 1983/84 aggregate sugar consumption is expected to move up, albeit marginally. In other industrialized nations such as the United States, Canada and Japan, the vitality of their respective economies are also extremely important to changes in sugar utilization. However, the influence of sugar substitutes (both non-caloric sweeteners that are consumed for dietary reasons and caloric sweeteners, such as HFCS) are becoming increasingly important factors and, as we have seen for the U.S., they are contributing to a downward trend in sugar utilization.

In contrast, in Eastern Europe and the Soviet Union where sugar substitutes are not factors, sugar consumption has been trending slowly upward over the last several years and is expected to do so again in 1983/84. To highlight the situation in the Soviet Union, the world's largest sugar consuming nation, per capita consumption of sugar has held at about 44.5 kilograms over the past three years. In spite of poor domestic crops, this level was maintained by increasing imports. Since 1971 sugar utilization has grown at a rate of around two percent. With a much improved 1982 crop and imports at a record 7.4 million tons, however, per capita consumption is not thought to have changed as there is little reason to believe that significant increases were made in industrial uses. This suggests that significant amounts of sugar went to replenish what are believed to be rather depleted stocks. For 1983/84 it is expected that Soviet use levels should expand by about 2.5 percent to 12.3 million tons, especially if the excellent crop currently forecasted is achieved.

# WORLD CENTRIFUGAL SUGAR PRODUCTION AND CONSUMPTION FOR 1980/81 - 1983/84



SUGAR CONSUMPTION BY REGION  
1980/81 - 1983/84  
(Million Metric Tons)

Region	1980/81	1981/82	1982/83	1983/84
North America.....	13.01	12.99	12.60	12.37
Caribbean.....	1.14	1.18	1.18	1.19
Central America.....	0.82	0.83	0.82	0.87
South America.....	10.56	10.23	10.59	10.79
European Community.....	10.29	10.30	10.31	10.42
Other Western Europe.....	3.00	2.87	2.88	2.91
Eastern Europe.....	5.21	5.48	5.78	5.97
USSR.....	11.80	11.90	12.00	12.10
North Africa.....	3.30	3.45	3.58	3.68
Other Africa.....	3.96	4.07	4.21	4.35
Middle East.....	3.95	4.11	4.44	4.71
Asia.....	20.41	20.98	22.59	23.36
Oceania.....	1.02	1.03	1.01	1.01
Total.....	88.47	89.42	92.00	93.93

Turning to the developing countries, growth in sugar consumption is foreseen in Latin America, Africa, the Middle East and Asia. In Latin America, where per capita consumption levels are already relatively high, consumption increases largely reflect population increases in those net exporting countries where supplies are readily available, for example, in Central America. For Brazil and Mexico, Latin America's two largest sugar consuming nations, sugar use is expected to be up but well below the growth trends of recent years. Brazil's sugar use is estimated at 6.3 million tons, up only slightly from 1982/83. The apparent leveling off in consumption is primarily the result of diminishing disposable income owing to inflation. In Mexico, sugar consumption is forecast at 3.45 million tons, up 1.5 percent from 1982/83 reflecting the dampening of demand growth spurred by recent increases in retail prices.

With respect to Africa, the net sugar importing countries of North Africa are expected to consume 3.68 million tons, up 3 percent from 1982/83, due largely to continued upward trending growth in Egypt. In those net importing countries south of the Sahara, financial problems facing many of these countries has put a lid on sugar imports and thereby reduces the potential for consumption growth. Nigeria, however, is likely to again expand its sugar consumption supported by imports financed largely by oil export revenues. In the Middle East, sugar consumption is expected to total 4.71 million tons in 1983/84, up 6 percent and 15 percent respectively, from the previous two seasons. Many of these countries, such as Saudi Arabia, depend entirely on imports to supply their consumption needs. Turkey, the only significant producer and exporter of sugar in the region is enjoying upward trending consumption, up an estimated 10 percent this season to 1.33 million tons, due largely to the increased availability of domestic availabilities reflecting recent impressive expansion in beet sugar production.



As a region, Asia displays the most impressive anticipated growth with a use level forecast at 23.36 million tons for 1983/84 representing one-quarter of projected world consumption. Particularly striking is the forecasted growth in sugar utilization in India, Pakistan and China. India and Pakistan, both of which experienced record crops the last two seasons, are faced also with record stocks. While exports are expected to help drawdown this surplus, mainly in the case of India, release of stocks by the respective governments and lower domestic prices are expected to stimulate internal consumption. India's sugar consumption for 1983/84 is forecast at 7.77 million tons, up 14 percent for both of the previous two seasons. With respect to China, the government's efforts to raise living standards has greatly affected sugar consumption. Combined with higher domestic production and supported by imports together with the growth in China's huge population, sugar utilization has jumped 21 percent since 1980/81 from 4.2 million tons to a projected 5.1 million tons this season. The opportunity is great for further potential growth during the 1980's owing to the low level of China's current per capita consumption, estimated by various sources at around 5 kilograms.

### Trade

For the sugar year just begun, most aspects of world sugar trade are expected to follow recent trends. Focusing on world sugar import needs, 1983/84 imports are currently likely to approximate 26 million tons. This level of trade would represent just over one-quarter of anticipated world production. As usual, the bulk of new crop world sugar will be consumed in those countries where it is produced.

Analyzing the composition of expected world sugar import needs during 1983/84 by region and major importing countries reveals some interesting developments. For North America, the downturn in import needs from 4.57 million tons in 1982/83 to 3.85 million tons this season largely reflects lower import requirements for Mexico due to its improved domestic supply situation concomitant with the anticipated decline in consumption. As usual, the countries of the Caribbean and Central America are largely self-sufficient in sugar and market their exportable surpluses. The same situation holds for South America with several important exceptions. The two major South American sugar importers in recent years have been Venezuela and Chile. Both countries have been making efforts to increase domestic production and thereby reduce their respective deficits between internal supply and demand. These efforts appear to be paying off as 1983/84 import needs are expected to be down 17 percent and 47 percent, respectively. Peru and Ecuador, due to crop losses caused by abnormal weather conditions (e.g. excessive rains and floods) imported relatively large quantities of sugar during 1982/83. An anticipated improvement in Peru's domestic supplies in 1983/84 suggests a significant lowering in import needs. Ecuador, in contrast, is experiencing continued weather problems with their new crop and may import as much as 200,000 tons of sugar during 1983/84.



World Sugar Imports  
1980/81--1983/84  
(Million metric tons)

Region	1980/81	1981/82	1982/83	1983/84
North America.....	5.28	4.86	4.57	3.85
Caribbean.....	0.01	0.38	0.13	0.13
Central America....	0.00	0.00	0.00	0.00
South America.....	0.78	0.74	0.90	0.74
European Community..	2.16	2.42	2.11	2.63
Other Western.....				
Europe.....	0.85	1.01	1.02	0.89
Eastern Europe.....	1.08	1.13	0.98	1.12
USSR.....	4.97	5.22	7.35	5.25
North Africa.....	1.99	2.10	2.11	2.23
Other Africa.....	1.11	1.01	1.03	1.24
Middle East.....	2.74	2.59	2.77	2.80
Asia.....	5.72	5.97	4.86	5.25
Oceania.....	0.22	0.16	0.30	0.30
World total....	26.91	27.59	28.13	26.43

In Europe, the EC is expected to import about 2.63 million tons, largely composed of raw sugar from ACP countries. In turn, however, the EC will again be a significant exporter of refined sugar shipping mainly to markets in Africa (e.g. Nigeria and Egypt), the Middle East and the USSR. Non-EC Western Europe is expected to see some slackening in import needs. Eastern Europe's imports are estimated at 1.12 million tons for 1983/84, up 14 percent from the previous season. The upturn in Eastern Europe reflects smaller upcoming crops in some countries that require increased import supplementation to fill the supply/demand gap. In many of the countries, Cuba usually supplies a large share of imports under long-term CMEA (Council For Mutual Economic Assistance) agreements. Many of these Eastern European countries also are net exporters of refined sugar with Poland being the largest--exporting an estimated 250,000 tons of refined sugar against imports of around 60,000 tons of raw cane sugar. The Soviet Union has emerged as the largest single importer of sugar in the world. As a result of a series of poor sugar beet harvests since 1979, raw and refined sugar imports have increased significantly. With the outlook for this year's crop rather good, imports of both raw and refined sugar should ease off from last year's highs.

Soviet Union: Sugar Imports 1979-1983  
(Million metric tons)  
Raw Value

Year	Raw Sugar	Refined Sugar	Total
1979.....	3.77	0.32	4.09
1980.....	3.84	1.13	4.97
1981.....	4.19	1.03	5.22
1982.....	6.16	1.19	7.35
1983 <u>1/</u> .....	4.50	0.75	5.25

1/ Estimate.

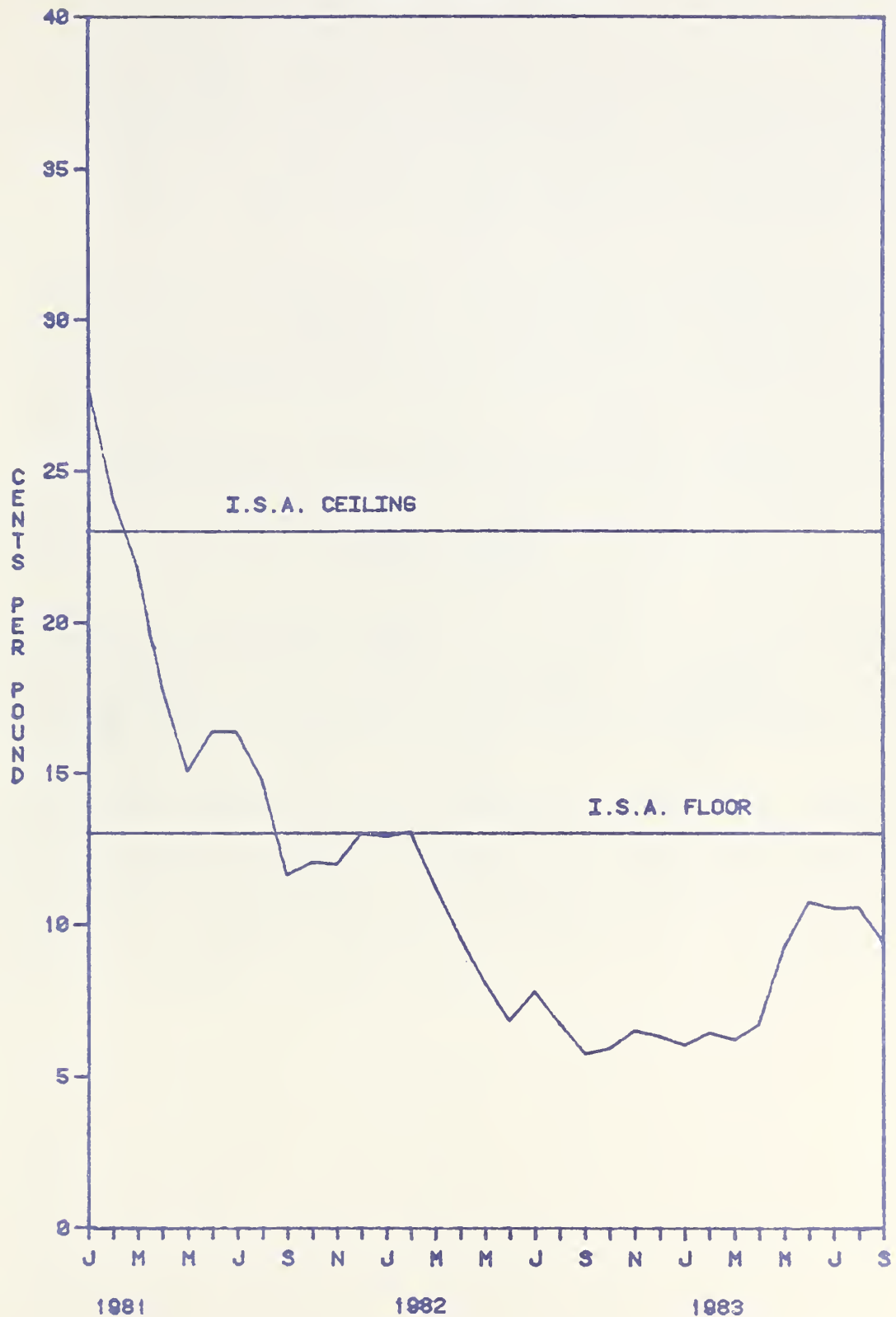
The upsurge in sugar imports into the oil rich countries in the Middle East as well as Nigeria is expected to continue during 1983/84 albeit at a slower pace than in earlier years. Total imports largely composed of refined sugar into the Middle East are estimated at 2.80 million tons accounting for 11 percent of the world total. Owing to its lack of refining capacity, Nigeria's imports are also confined to refined sugar. This season's sugar imports are expected to total 650,000 tons, up 5 percent and 8 percent from the previous two seasons. While the Nigerian economy is experiencing belt-tightening measures, sugar imports are expected to continue to grow due to rapid population growth and the relatively low retail price of sugar maintained by the government in order to make this basic staple readily available to the public. Interestingly, in spite of the recent surge in sugar imports, Nigeria's per capita consumption is estimated at only around 11 kilograms implying, considerable potential for further sugar import growth in the coming years.

In Asia, sugar imports are expected to be up 8 percent to 5.25 million tons largely reflecting higher imports into Japan due to their lower domestic crop, and further expansion in China's import needs. Aside from China, Indonesia has been probably the most fluid import market in the region over the last several years. Efforts to expand production and processing facilities has enabled Indonesia to move closer to their goal of self-sufficiency. Owing to good crops the last two years and a build-up of imported stocks, Indonesia's imports are expected to dip to 100,000 tons this season compared with 750,000 tons in 1980/81. Indonesia's goal is to become self-sufficient in sugar by 1988.

#### Prices and Stock Levels

Because of their historic extreme volatility, forecasting world sugar prices is always difficult. However, reasonable assumptions regarding prices can be made given our analysis of the global sugar balance and the state of sugar markets around the world. Low sugar prices have prevailed since the spring of 1981 due to a fundamental imbalance in supply and demand for sugar fed by record crops in 1981/82 and 1982/83 which outpaced demand and which has resulted in a build-up of world stocks. During this period world prices (as measured by the ISA daily price), reflecting these developments, dipped to a low of 5.76 cents per pound in September 1982 and peaked in June of 1983 at 10.74 cents per pound. Over the last three months prices have averaged 10.17 cents per pound and in recent weeks have dipped again to under 10 cents.

# INTERNATIONAL SUGAR ORGANIZATION INDICATOR PRICE



SOURCE: INTERNATIONAL SUGAR ORGANIZATION

In spite of the analysis that world supply and demand for sugar should be in rough balance in 1983/84, the fact that huge surpluses generated over the last two seasons still overhang the market effectively precludes a sharp increase in prices over the next several months. As is customarily accepted among sugar analysts, world markets need a minimum stock level of about 25 percent of annual consumption. If stocks drop close to that level, world prices have historically become highly volatile and have been known to rise sharply. USDA's analysis of stocks at the end of the 1982/83 totaled 45.37 million tons representing 49 percent of consumption. Given our current analysis for 1983/84 we see stocks at 46.10 million tons in August, 1984, relatively unchanged from ending stocks this past August.

Looking forward to 1984/85, if normal weather returns to those key producing areas which were plagued by weather problems this season (e.g. South Africa, Australia, the EC) the new world sugar crop could rebound to levels achieved in 1981/82 and 1982/83. Given the continued likelihood of low sugar prices and a continued resurgence in the world economy which hopefully will spread to the developing world, consumption will also advance in 1984/85 but may or may not keep pace with production. Under these conditions it does not appear likely that stocks will be drawn down significantly and therefore market conditions as we presently find them are likely to persist into 1984/85.

World Sugar Supply/Demand Balance  
1980/81-1982/83  
(Million Metric Tons)

Crop Year Ending Aug. 31	Total World Production	Total World Consumption	Production :Greater (+) or: Less (-) than Consumption	World Stocks as end of Crop Year	Crop Year End Stocks as of Consumption
1980/81.....	88.47	88.47	+0.00	25.17	28.45%
1981/82.....	100.63	89.42	+11.21	36.38	40.68%
1982/83.....	100.99	92.00	+8.99	45.37	49.32%
1983/84.....	94.66	93.93	+0.73	46.10	49.07%



## Cocoa, Coffee, and Tea Situations

### COCOA

World cocoa bean production for the October-September 1983/84 crop year is forecast at 1.64 million metric tons, 7 percent greater than the poor 1982/83 outturn of 1.54 million. The projected increase this season is largely the result of a larger Ivory Coast crop, following a rather severe Harmattan (dry winds from the Sahara) and accompanying drought conditions, and a significant increase in Malaysian production, reflecting improved growing conditions and extensive new plantings coming into bearing. Ecuador's crop is also expected to be larger, following the heavy rains and flooding that caused high losses from pod rot and other diseases during the 1982/83 season, and Brazilian production is forecast to be slightly above the bumper 1982/83 outturn of 339,000 tons. (Based on past performance, the chances are two out of three that actual world production will not vary more than 5 percent from the estimate given above.)

World cocoa bean grindings in 1984 are forecast to increase slightly to 1.63 million tons if production estimates are realized. Global production and grind are expected to be in close balance in 1984, following an estimated 98,000-ton stock drawdown during 1983. The trend toward increased production of non-chocolate confectionery products and chocolate coated filler-type candies have tended to slow the rise in world cocoa usage in recent years.

Cocoa bean prices (the average of the daily closing price of the nearest three active futures trading months on the New York market) rose steadily during the first half of 1983, increasing from 78 cents per pound in January to \$1.00 by June. July and August prices stabilized at the June level, but prices declined somewhat during September to 93 cents, as early season crop estimates pointed to a larger world harvest in 1983/84.

The International Cocoa Agreement (ICCA) is scheduled to expire on September 30, 1984, and efforts are underway to negotiate a new ICCA. The Buffer Stock Manager has not made any additional purchases since March 8, 1982, when the cumulative total was 100,345 tons. The International Cocoa Council (ICCO) has since imposed a moratorium on further purchases.

(Contributed by Mr. Rex Dull, Horticultural & Tropical Products Division, latest circular on cocoa. FCB 2-83, 10/83)

## Coffee

World coffee production for 1983/84 is currently estimated by the U.S. Department of Agriculture at a record 93.6 million bags of 60 kilos, up 14.8 percent from 1982/83. Exportable production--which represents total harvested production less domestic consumption in producing countries--is estimated 72.2 million bags. Recovery of the Brazilian crop from the frost-damaged 1982/83 level more than accounted for the increase.

Over 99 percent of the world's coffee is grown by members of the International Coffee Organization (ICO). During 1983/84, export sales by all producers are expected to total 66.3 million bags, up from 65.9 million bags for 1982/83. Nearly all the growth in exports which has occurred over the past several years has been to importing non-members. World stocks at the end of the 1983/84 marketing year are expected to reach 47.5 million bags, the highest level in more than a decade. Producing countries now hold stocks equivalent to 72 percent of annual exports and in some cases stocks are equivalent to a whole year's production. Coffee prices for sales to member importing countries of the ICO have remained surprisingly firm over the past year. Mounting stocks, stagnant world consumption and the low price received for sales to non-member markets are among the major problems facing the ICO today.

Contributed by Mr. C.Milton Anderson, Horticultural & Tropical Products Division,  
(latest circulars on coffee: FCOF 2-83, 7/83).

## Tea

World tea production for 1983 is expected to reach a record 1.96 million metric tons, 4 percent greater than the bumper 1982 outturn of 1.89 million. The larger crop this year is a result of increased production by China and Kenya, and a recovery in Indonesian output from the poor 1982 harvest, which was reduced by dry weather and volcanic activity near major growing areas.

World tea production and consumption have been in close balance over the past several years, but increased consumption in producing countries and a series of poor crops in Sri Lanka have resulted in a tightening in supplies and firmer prices in 1983. This situation is likely to continue into 1984.

(Contributed by Mr. Rex Dull, Horticultural & Tropical Products Division  
latest circular on tea: FTEA 3-83 6/83).

Robert D. Barry and Fred Gray, Agricultural Economists  
Economic Research Service

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Washington, D.C.

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## INTRODUCTION

The sweetener market has been radically transformed by the introduction of a continuous enzymatic process for mass-production of high fructose corn sirup (HFCS) a decade ago. From a clearly commanding position in the sweetener market, sugar has moved to a shared importance with HFCS.

Now, just short of the full maturation of HFCS within the sweeteners complex, a new presence is providing dramatic possibilities. Aspartame (APM), a low-caloric sweetener nearly 200-times as sweet as sucrose, was approved for dry products use in 1981. Its biggest potential, however, opened up just 4 months ago when the Food and Drug Administration approved APM use in carbonated soft drinks. Since then, all major soft drink companies have adopted APM in varying degrees, and all will have at least one reformulated diet drink using APM by year-end.

We are moving toward a new era of multiple sweetener use. More sweeteners will be used in combination for particular products to meet smaller, more specific markets. Note, for instance the market segmentation in soft drinks this past year--from full-caloric to no-cal, lo-cal, caffeine-free, and salt-free products!

Sugar, however, continues to be important. Sugar has a range of virtues for industrial use, apart from simple sweetening power. This year, sugar's share of caloric (let us also mean nutritive) sweeteners in the U.S. market is estimated at 58 percent; its share of all sweeteners, including no-cal and lo-cal, 53 percent.

If you have received the most recent issue of the Sugar and Sweetener report, you have seen the new dressed-up cover with a photo of a teaspoon of sugar being poured into a cup of coffee. Toward the end of this talk, I will outline market prospects for coffee, tea, and cocoa. U.S. imports of these three products this year could exceed \$3.7 billion.

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60 YEARS OF SERVICE TO AMERICAN AGRICULTURE

## THE SWEETENER SITUATION

### SUGAR

Prices: The domestic price of raw sugar (c.i.f., duty/fee-paid, New York) ranged between 20.1 and 22.8 cents a pound last fiscal year--3 percent below to 10 percent above the Market Stabilization Price (MSP). Prices for fiscal 1983 averaged 21.8 cents or 5 percent above the MSP of 20.73 cents a pound. In retrospect, the sugar import quota--the most important lever in determining U.S. market prices for raw sugar--worked rather well. This did not derive from the pure economic science for which Berkeley professor Gerard Debreau just won the Nobel Prize. Rather, the result came from a real world mix of economics and practical judgment with respect to supply and demand factors which continued to operate in the U.S. market, however insulated that market was from the turbulent world outside. In particular, to set the quota, estimates had to be made of likely sugar use, shifts in use among alternative sweeteners (especially in soft drinks), potential production (with assorted uncertainties from weather and grower-processor contractual problems), and existing stocks. Inevitably, good fortune played a role, as it does with even the best laid plans.

Effective October 1, an MSP of 21.17 cents a pound has been established for the 1983/84 crop. Spot prices are currently about 22 cents a pound compared with 20.4 cents in October last year. For the July-September quarter, domestic raw sugar prices averaged 22.3 cents, just a half-cent increase from third-quarter 1982. For the same period, the differential between the world price (f.o.b. Caribbean) and the U.S. raw price has dropped from 15 cents to 12.1 cents a pound as the world price rose from 6.8 cents to 10.2 cents a pound.

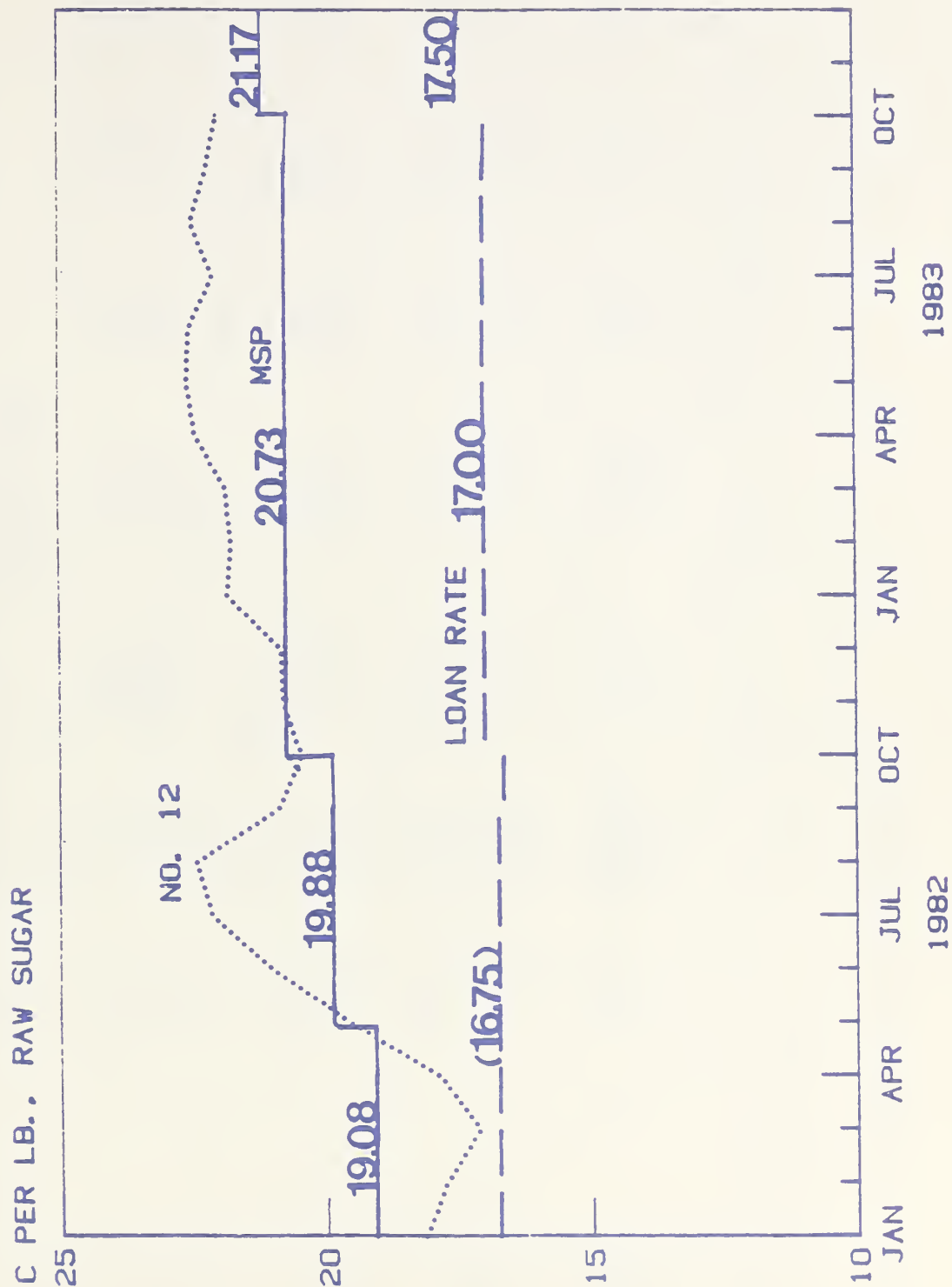
Paralleling the stability in the U.S. raw price, wholesale list prices for refined sugar in the Northeast market averaged 32.5 cents a pound in the third-quarter, just slightly up from last year (see table). Most other markets showed about a 1-cent rise.

Retail prices have also been stable in fiscal 1983. The U.S. average (all-sizes of packages) was 36.5 cents a pound in the third quarter, up only 2.2 cents from third-quarter 1982. In the Northeast, the price spread between retail and wholesale has remained about 8 cents a pound.

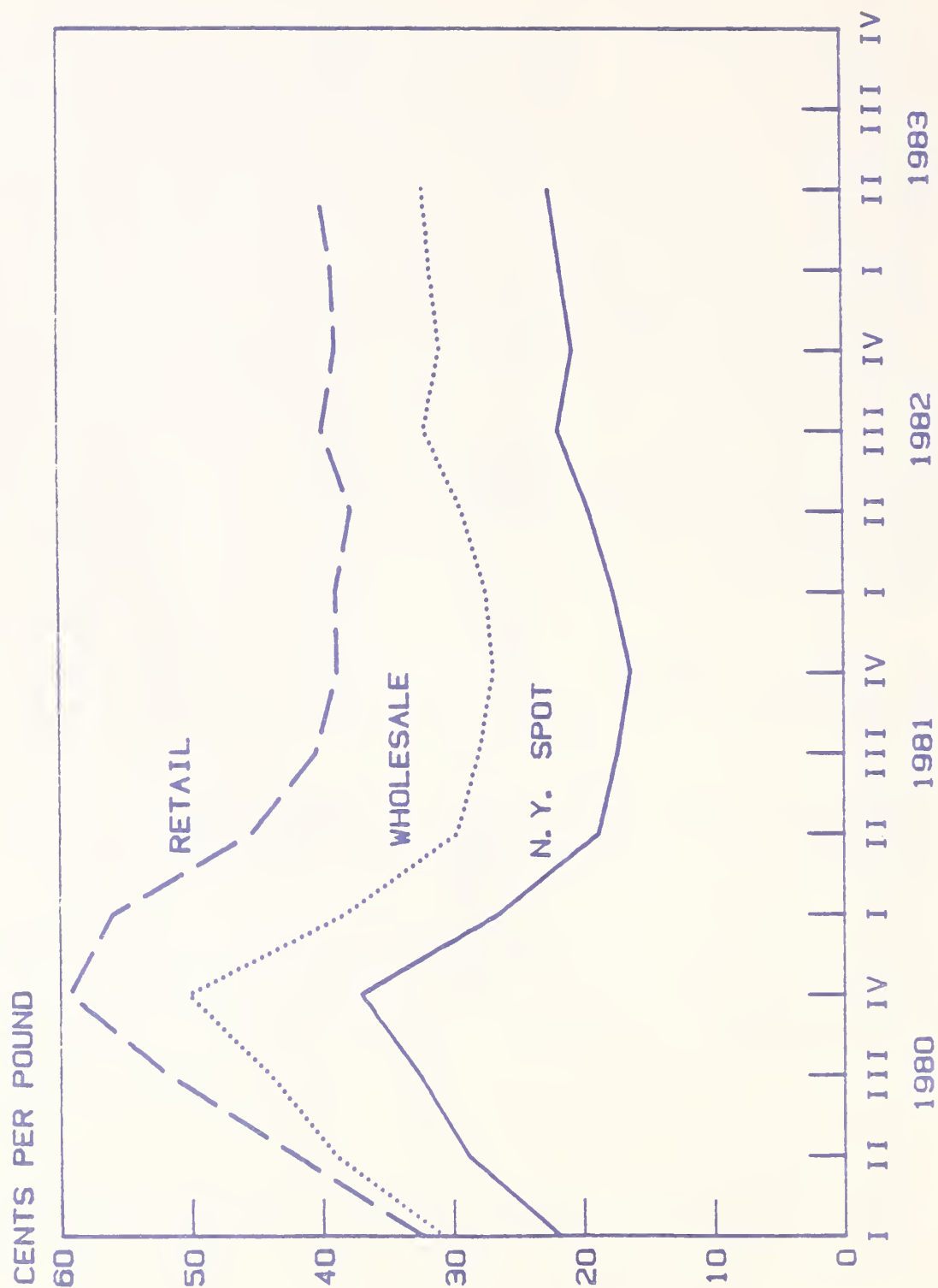
Retail prices of sweetener-containing products rose 1.8 percent between January and September compared with 1.6 percent for the comparable period in 1982. The largest rise in price this year was for cereal products, up 5.6 percent. For seven cereal and bakery products, prices rose 2.6 percent. Prices were virtually unchanged for ice cream products, but hard competition stimulated some price reduction in beverages at both wholesale and retail levels.



# U. S. SUGAR LOAN RATE, MSP, AND MARKET PRICE FOR RAW SUGAR



# U. S. SUGAR PRICES



### Table 1.--Price spreads for sugar

Calendar year and quarter	World : No. 11	Difference : : between : : No. 11 and : : No. 12	New York spot : No. 12	Difference : : between : : No. 12 and : : wholesale :	Northeast : wholesale : list	Difference : : between : : wholesale : and retail :
Cents per pound						
1980						
I	20.13	1.71	21.84	8.86	30.7	1.7
II	28.18	.71	28.89	10.11	39.0	3.2
III	31.74	.90	32.64	11.36	44.0	7.8
IV	36.01	1.08	37.09	13.21	50.3	9.0
1981						
I	24.69	1.81	26.50	11.80	38.3	17.7
II	16.44	2.32	18.76	10.94	29.7	15.7
III	14.25	3.08	17.33	10.67	28.0	12.4
IV	12.35	3.99	16.34	10.46	26.8	12.0
1982						
I	12.43	5.26	17.69	9.71	27.4	11.5
II	8.17	11.33	19.50	9.70	29.2	8.5
III	6.84	14.99	21.83	10.27	32.1	7.8
IV	6.23	14.46	20.69	10.21	30.9	8.0
1982						
I	6.19	15.43	21.62	9.98	31.6	7.5
II	8.93	13.59	22.52	9.58	32.1	8.0
III	10.17	12.11	22.28	10.22	32.5	7.7
IV						

Table 2.--Percentage change (January to September) in the price of sugar and sugar-containing products, 1979-83

Year	Average price of 7 cereal and bakery items	Average price of 7 other items	Average price of the 14 items	Average retail sugar price
			Percent	
1979	7.8	5.6	6.7	2.4
80	7.3	8.8	8.0	63.8
81	4.6	4.4	4.5	-26.8
82	1.9	1.3	1.6	7.6
83	2.6	1.0	1.8	2.0

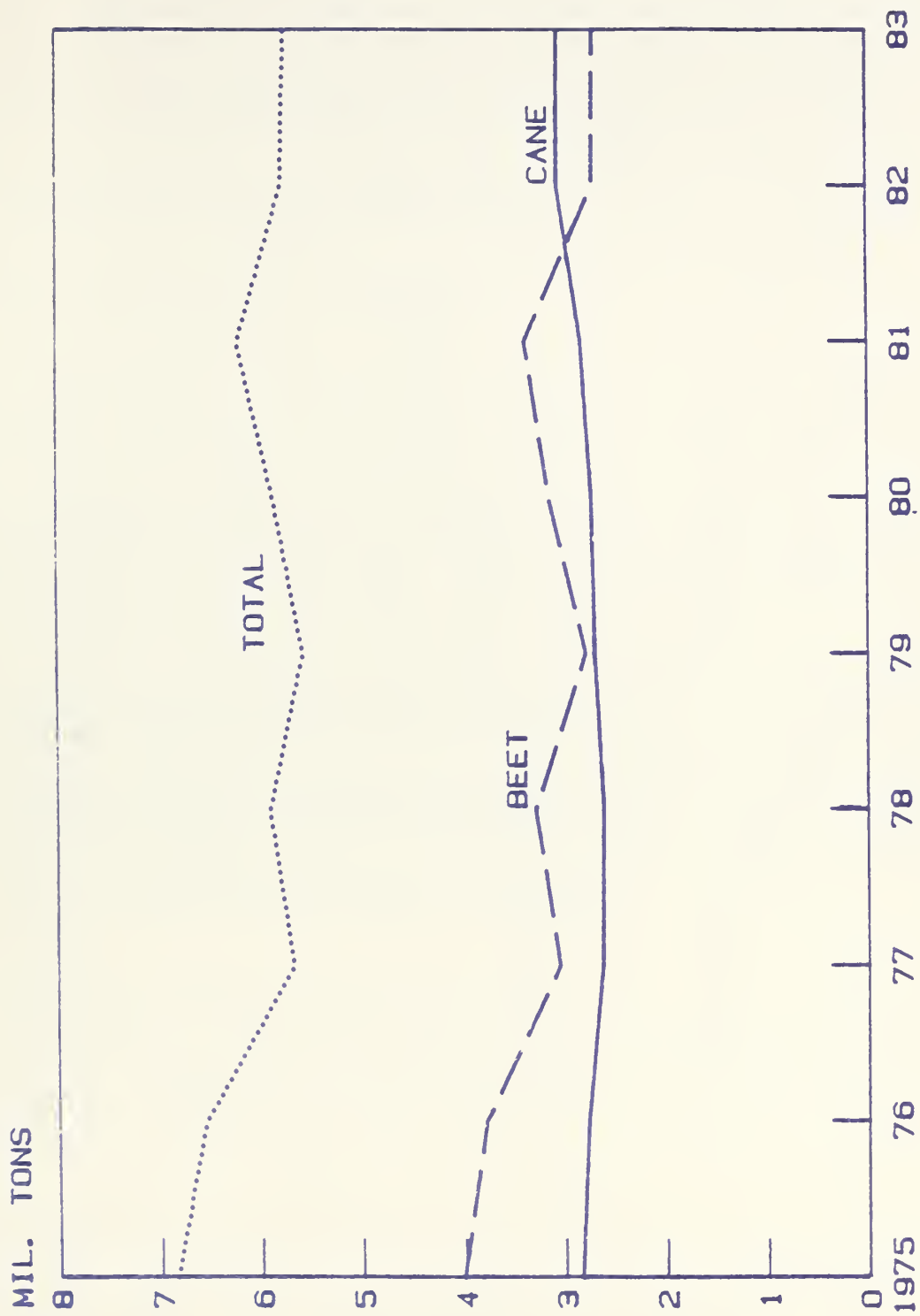
Production: U.S. sugarbeet harvested area in 1983/84 , estimated at 1.05 million acres is up less than 2 percent from the much-reduced crop last season. Acreage increased in the Idaho-Oregon and Michigan-Ohio areas, and in California, Minnesota, and the Great Plains states of Nebraska and Texas. Among the seven states with lower acreage, five are in the Great Plains (Colorado, Kansas, Montana, New Mexico, Wyoming), and two (Arizona and New Mexico) will have no sugarbeet acreage at all. North Dakota has slightly lower acreage, but the Red River Valley area is up overall because of higher acreage in Minnesota. The prospective U.S. sugarbeet yield of 20.2 tons an acre is down slightly from last year's 20.6 and considerably below the previous year's 22.4 tons. Factors lowering yield were late planting in several areas because of a late spring, less than ideal summer growing conditions in several States, and delayed planting because of contract negotiations problems in Colorado and Kansas. The production estimate of 21.2 million tons of sugarbeets is close to last year's outturn. However, recoverable sucrose is reported down in California because of the wet weather which delayed harvesting, and in some of the Great Plains States because of early frosts. Thus, U.S. beet sugar production may not reach 1982/83's 2.72 million tons, raw value.

The domestic sugarcane area (including seed cane) for harvest is expected to total 778 thousand acres in 1983/84, 2.5 percent more than in the previous campaign. Acreage was up in Florida, Louisiana, and Hawaii, but decreased slightly in Texas. The prospective U.S. average cane yield of 38.9 tons per acre is down marginally from last year. Yields are up in all States, except Florida where yields are forecast to fall 5 percent. U.S. cane sugar output is estimated at 3.05 million tons, raw value, almost even with 1982/83's 3.06 million. Production is expected up in Hawaii and Texas, remain the same in Louisiana, and ease slightly in Florida.

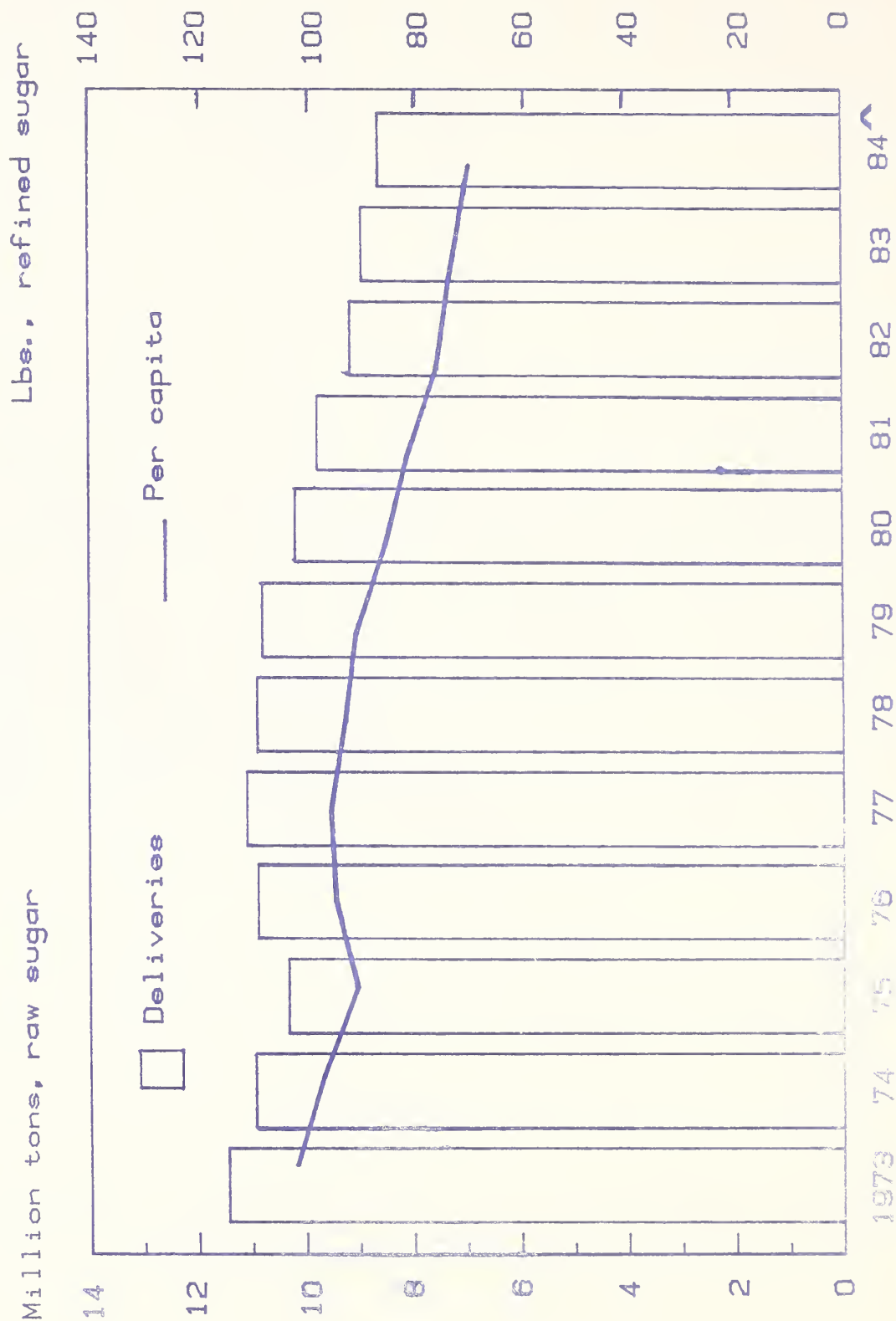
The estimated production of 1983/84 beet and cane sugar totaled 5.75 million tons, almost equal the previous season's output. On a calendar-year basis, 1983 U.S. sugar production is estimated at 5.8 million tons, about 130,000 tons below 1982.



# U. S. SUGAR PRODUCTION



# U. S. Sugar Deliveries and Per Capita Consumption



^ Estimate.

Utilization: Sugar deliveries data through September 1983 will be available in the November 15 Sugar Market Statistics. Deliveries by type of buyer (beverages, confectionery, bakery, and other users) will also be available then. Indications are that July-September sugar sales were strong, about equal to last year, and that fiscal 1983 deliveries could total 8.9 million tons, raw value, compared with 9.2 million in fiscal 1982. Consumption in fiscal 1983 is estimated at 9 million tons, based on deliveries plus 91,000 tons raw sugar equivalent of sugar blends and mixtures. The blends, with a sucrose content of less than 94 percent (the rest mainly high fructose corn sirup) had been able to circumvent the sugar quota because they fell outside the tariff classification for sugar. In late June the President imposed a zero quota on such near-sugars, pending investigation by the U.S. International Trade Commission. The ITC held hearings October 25.

U.S. per capita consumption of refined sugar in 1983 is estimated at 71.4 pounds, 2.4 pounds below 1982 and 12.3 pounds down from 1980.

Trade: Sugar imports in fiscal 1983 totaled 3.154 million tons, raw value, about 370,000 tons below fiscal 1982 (excluding receipts from Puerto Rico). That total consists of 2.889 million entered under quota, 174,000 tons quota-exempt raw sugar for re-export in refined form (permitted since June 28) and 91,000 tons sugar blends sugar-equivalent. The 2.889 million differs from the quota of 2.8 million designated in October, 1982 because of the net 90,600 tons allowed for minimum shipments from small countries, 2,000 tons specialty sugars (permitted since June 23), and about 4,000 tons unfilled quota. Final determination with respect to polarization and bookkeeping could change the final import figures.

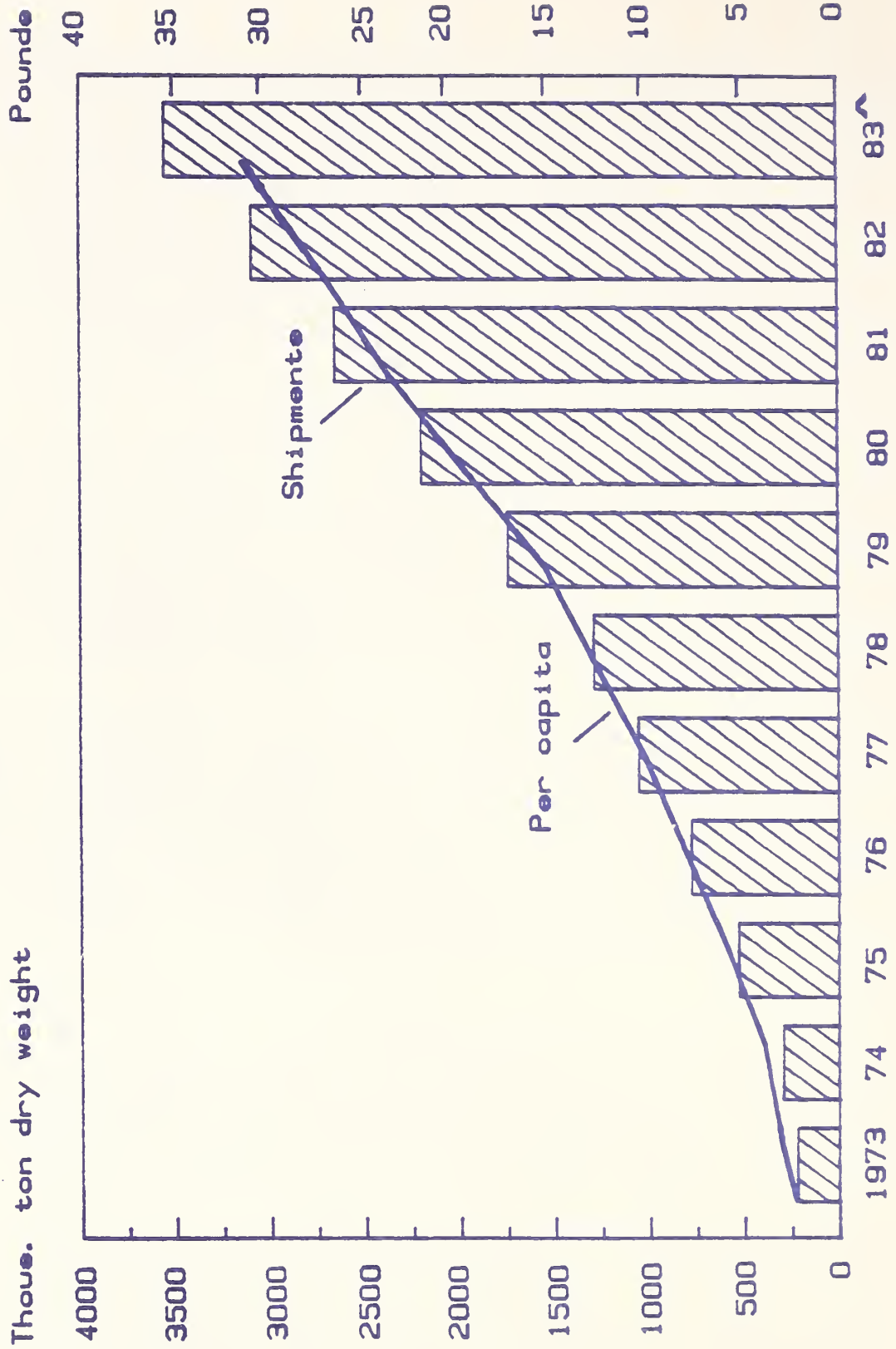
For the 174,000 tons of quota-exempt sugar, about 104,000 tons were re-exported in refined form by September 30 as refiners made use of the "drawback" privilege (U.S. government rebate on duties and fees paid on previously imported raw sugar). The dollar amount of drawback per ton re-exported was based on U.S. raw sugar tonnage imports in fiscal 1982 when combined duties and fees were high, reaching almost 6.9 cents a pound in some months. Total exports, including shipments of about 35,000 tons to Puerto Rico, are 140,000 tons, about half that in fiscal 1982. Except for Puerto Rico, re-exports were not profitable under the quota program until an exemption was provided in late June.

#### CORN SWEETENERS

At this time last year, the corn wet milling industry was starting to feel the effects of overcapacity. As operating rates fell, prices dropped to 11.7 cents for HFCS-42 and 16.3 cents for HFCS-55 in the Chicago-West market. Today, the picture is much different. HFCS-42 list prices averaged 20.9 cents a pound, dry basis, in September and HFCS-55 averaged 24.5 cents a pound--up 32 percent and over 32 percent respectively, from September 1982.

The turnaround was not unexpected, as the potential for further HFCS use in soft drinks seemed persuasive even before HFCS prices declined in the winter of 1982. The Coca Cola company's announcement in early March to allow 75 percent HFCS-55 in Coke fountain sirup re-generated the corn wet milling industry. The biggest impact, however, came in April when PepsiCo approved 50 percent HFCS in bottled and canned Pepsi. In September, PepsiCo added a little more demand for HFCS when the company approved 80 percent HFCS for Pepsi fountain cola. All these approvals boosted potential demand for HFCS by a total of over 400,000 tons, not all of which will be fully realized in 1983.

# High Fructose Corn Sirup: U.S. Shipments and Per Capita Consumption



^ Preliminary.



Counting all food and beverage uses, HFCS consumption in 1983 could total 3.55 million tons, dry basis, up from 3.1 million in 1982. Glucose corn sirup use is estimated at marginally above last year's 2.11 million tons while dextrose use is tracking at about last year's level of 0.41 million tons. List prices for glucose in various markets in September ranged between 15 and 16 cents a pound, dry basis, up 2-1/2 to 3 cents from a year earlier. Dextrose prices, at 26 to 28 cents a pound, are up less than 1-cent from September last year.

Table 3.--High fructose corn sirup prices relative to sugar,  
Chicago-West market, 1978-83

Calendar year and quarter	High fructose corn sirup		Beet sugar	Price discount to sugar	
	HFCS-42	HFCS-55		HFCS-42	HFCS-55
	Dollars per 100 lbs.			Percent	
1978	12.1	NA	18.7	35.3	NA
79	13.2	NA	19.7	33.0	NA
80	23.6	NA	38.3	38.4	NA
81	21.5	23.6	28.3	24.0	16.6
1982					
I	14.1	20.0	27.5	48.7	27.3
II	14.5	19.5	26.8	45.9	27.2
III	15.8	18.5	28.2	44.0	34.4
IV	12.8	17.2	28.0	54.3	38.6
1983					
I	11.7	16.3	28.0	58.2	41.8
II	17.6	19.9	28.9	39.1	31.1
III	20.9	24.2	29.5	29.2	18.0

#### OTHER SWEETENERS

Honey production in 1983 could total 200 million pounds, down from 230 million in 1982. Earlier prospects for a crop equal to last year faded with the severe drought in the Midwest this year. Imports for the year are expected to be a record 100 million pounds, up from last year's 92 million. Exports are lagging last year's pace and without a significant pickup in the last quarter will fall slightly short of 1982's 8.5 million. Domestic disappearance of honey is estimated at 240 million pounds, down from 251 million in 1982.

The support price for 1983-crop white honey (April 1983-March 1984) is 62.2 cents a pound, while the current U.S. market price is around 51 cents. About 45 million pounds of the 1983 crop have been placed under loan. About 75 million pounds of the 1982 honey crop were forfeited to the Commodity Credit Corporation (CCC). Total forfeitures for 1983 may match or slightly exceed 1982's level. Lower-priced imports have undercut domestic honey and encouraged forfeiture of honey to the CCC. U.S. honey imports are expected to continue high in 1984, possibly setting another record.

U.S. pure maple sirup output is estimated at 1.15 million gallons in 1983, down 11 percent from 1982. An early warm spell in Massachusetts and Southern New York in February 1983, severely reduced production. Vermont continues as the leading state, producing 495 thousand gallons in 1983 compared with 500 thousand the previous year. New York produced only 235 thousand gallons, down sharply from 320 thousand in 1982. Pure maple sirup has been selling this year for around \$21 a gallon in Maine and New Hampshire, and \$17 (sold mostly in bulk) in Vermont. Prices are about the same as in 1982, despite lower production, because stocks carried over into 1983 were large, and also imports (through August) were up substantially. Virtually all imports (about half of U.S. consumption) comes from Canada.

## THE SWEETENER OUTLOOK

### SUGAR

The outlines of U.S. sugar policy through the 1985/86 crop are spelled out by the 1981 Farm Act. For the sugar industry, a major consideration through 1985/86 is the operation of the sugar programs to support the loan rates established by the Farm Act. We have seen in 1982 and 1983, adjustments in program fees, quotas, and dutiable imports. A major leakage in the quota system--sugar blends--has been fixed. Allowances have also been made for certain sugars to be quota-exempt. In the coming months, other operational aspects will be considered, including: the continued use of 98-degree polarization as a standard for making preliminary charges to quota; requirement for earlier advance notice of import quota shortfalls; and how much overquota sugar, if any, the "last ship of the year" should be permitted to enter (to be charged against the next year's quota) without having the sugar go into bond.

There is much interest, too, in the Section 22 (Agricultural Adjustment Act of 1933, as amended) "final fee proclamation." This refers to the President's emergency proclamation of December 1981 implementing the Farm Act, and the investigation and hearings held by the U.S. International Trade Commission. The emergency action set a 1-cent import fee differential between raw and refined sugar. However, an increasing quantity of refined sugar is reportedly being imported and, thus, is undercutting U.S. refined sales.

Regulations are also pending with respect to quota exemptions for sugar to be used for production of polyhydric alcohols for non-food use, and for sugar to be re-exported in sugar-containing products.

The Secretary of Agriculture has the authority to revise the sugar quota as circumstances warrant. However, a quarterly review process has been formalized to evaluate supply/demand factors that affect the relation of market prices to the MSP and therefore require import quota review. The final fee proclamation is also expected to contain a provision for periodic review of the MSP, to evaluate such MSP-related matters as adjustment in interest rates and shipping charges.

Turning to the supply/use balance for 1983/84 (see table), note that beginning stocks were drawn down from the previous season, as anticipated, but that the quota is such as to keep 1983/84 ending stocks at about the level of beginning stocks. Quota-exempt imports will about double, but could be higher depending on the world market price for refined sugar.

Domestic use of sugar is estimated to fall 200,000 to 400,000 tons. The higher estimate assumes either PepsiCo or the Coca Cola company approves 75 percent HFCS in canned and bottled Coke.

Table 4.--U.S. sugar supply and use, fiscal years 1982/83 and 1983/84

Item	FY-1982/83	FY-1983/84
	1,000 short tons, raw value	
Beginning stocks	1,649	1,353
Production	5,780	5,750
Receipts from Puerto Rico	35	35
Imports, total	3,154	3,425
(Sugar blends)	(91)	(--)
(Quota exempt)	(174)	(350)
(Quota)	(2,889)	(3,075)
Total supply	11,320	10,020
Exports	140	454
Domestic use	9,025	8,600-8,880
Refiner loss and statistical adjustment	100	100
Total use	9,265	9,154-9,354
Ending stocks	1,353	1,209-1,409

Looking to the 1984/85 crop, U.S. growers and processors can anticipate relative price stability to continue, with a loan rate of 17.75 cents a pound for raw cane sugar (about 21.3 cents for refined beet sugar) and an MSP price of 21-22 cents a pound. Also important are cost expectations for sugar crops, net returns from alternative crops, and grower-processor relations. The first official USDA indication of 1984 sugarcane acreage will be in the mid-January Crop Production-Annual report which has estimates of sugarcane harvested for seed in 1983/84. The first official estimate for sugarbeet plantings will be reported in the mid-February Prospective Plantings report.



With support levels not likely to keep up with inflation and production cost increases, and with recent changes in some contracts that in effect shift dollar returns toward beet processors relative to growers, sugarbeet acreage seems more likely to decline than to increase. There is also some question regarding how many of the six factories, which a Great Plains beet processing company has offered to sell to its growers, will operate in 1984/85. However, rainfall has been adequate to abundant in most sugarbeet areas and with relatively wet fields normal spring weather would provide the potential for higher yields and sucrose recovery. Overall, domestic beet sugar production in 1984/85 seems likely to drop about 100,000 tons to around 2.6 million tons, raw value.

Domestic sugarcane acreage in 1984/85 could decline slightly, and with cane yields not likely to increase much over 1983/84's high 39 tons of cane an acre, 1984/85's domestic cane sugar output could be marginally lower in 1984/85. Beet and cane sugar production together would total 5.6 million tons, down about 3 percent from 1983/84.

#### ALTERNATIVE SWEETENERS

Mr. Alan Greditor of Drexel, Burnham, Lambert will be presenting us an outlook for corn sweeteners and the corn wet milling industry. Our own estimate is that, in 2 or 3 years, HFCS could reach per capita saturation at about 36 pounds compared with 66-67 pounds for sugar. In 1985 or 1986, HFCS use could be 4.3 million tons, dry basis, or about 29 percent of caloric sweetener consumption compared with 53 percent for sugar. HFCS would complete its incursion into the sugar market and, beyond that, growth of both HFCS and sugar would be at a slow rate tied largely to population growth. That scenario is largely still on the mark, but only through 1985/86. The July 1983 FDA approval of APM has changed the scenario for all sweeteners in the post-1985/86 period.

Through 1985/86, the major impact of APM will be on saccharin, in soft drinks use. The market for lo-cal soft drinks, expanding rapidly, is estimated at 15-20 percent of all soft drinks consumption in 1983. In 1984, boosted by APM, lo-cal is expected to account for 20-25 percent of all soft drinks. APM will be used in soft drinks mostly in combination with saccharin, at a ratio of 20-30 percent APM. Saccharin will lose to APM for several years until the market for lo-cal soft drinks expands to the point where the joint demand for saccharin and APM overrides the initial loss of saccharin.

In 1984, APM consumption in all uses could reach 1,700 short tons or 2.9 pounds per capita in sugar-sweetness-equivalent. By 1985, APM use could rise to 5 pounds per capita.

Beyond 1985, APM appears likely to have an important impact on sugar and HFCS. However, APM's growth is not going to be on a 1-for-1 displacement of caloric sweeteners. Instead, APM's advance will be accommodated partly by growth in the use of overall sweeteners (caloric and low-caloric) as well as by losses on the part of sugar and HFCS.



## COFFEE, TEA, AND COCOA

World supplies of coffee and cocoa are expected to continue to be relatively abundant permitting reasonable prices to U.S. buyers for the next several months. Tea supplies are relatively tighter. A very small crop of coffee is produced in Hawaii; no tea or cocoa is commercially grown in the United States. Imports and exports of coffee, tea, and cocoa are reported monthly by the Bureau of the Census. Trade associations and private companies attempt to provide data on coffee roastings and stocks, tea use, and cocoa bean grindings. Data on stocks are not available for cocoa and tea.

### COFFEE

U.S. imports of coffee (including the green equivalent of processed products) for the first eight months of 1983 totaled 1.52 billion pounds, off marginally from a year ago. At this rate, calendar 1983 imports would about equal 1982's 2.35 billion pounds. By year-end, the dollar value of coffee imports exceed last year's \$2.9 billion because price are rising. Still, imports would be down substantially from 1980's \$4.2 billion.

Domestic coffee roastings have been estimated at 1.43 billion pounds for the first eight months of 1983, down 2.8 percent from a year ago. Annual roastings are also expected to decline slightly from 1982's 2.29 million and 1981's 2.32 million pounds.

The composite indicator price for Other Milds and Robusta coffees, 1976 International Coffee Agreement (ICA) basis, to measure green coffee price levels averaged \$1.24 a pound during the first 9 months of 1983, the same as a year earlier. The indicator price averages slightly higher when Colombian Milds and Unwashed Arabicas are included in the composite. The newly ratified Agreement aims at keeping the composite price within \$1.20 to \$1.40 per pound, by adjusting quotas when necessary. The President recently signed into law a bill allowing U.S. participation in the ICA for 3-years beginning October 1, 1983.

U.S. wholesale prices of roasted coffee have been relatively stable since October 1982, averaging \$2.44 a pound. With cooler weather approaching, wholesale prices are expected to rise slightly from \$2.43 cents a pound in August. Retail prices for roasted coffee have also been relatively stable since June 1981. Prices averaged \$2.48 a pound for the first 8 months of 1983, down from \$2.54 for the same period a year ago. Even if retail prices rise slightly this fall, the U.S. average retail price in calendar 1983 will fall short of 1981's \$2.53 and 1982's \$2.52 a pound.

Unless coffee roastings pick up in the last part of 1983, U.S. per capita consumption this calendar year seems likely to slip slightly from 1982's 10.1 pounds (green bean equivalent). However, the long-term downtrend in per capita use, which began about two decades ago when per capita use was about 16 pounds, could be slowing. Changes in lifestyles and technical factors such as obtaining more cups of coffee per pound of processed coffee, or drinking weaker coffee help explain the long-term decline.

## TEA

U.S. tea imports totaled 110 million pounds during the first 8 months of 1983, down 7 percent from a year ago. Imports for the year could fall 5 to 10 million pounds short of calendar 1982's 183 million pounds. Per capita tea consumption is expected to decline a little from 1982's 0.76 pounds. The dollar value of imports this year may total only slightly less than 1982's \$129 million, reflecting higher average prices.

Over the years, domestic tea use has held its own. Prior to 1975, U.S. consumption was growing, reflecting increasing use of tea bags, instant tea, and tea mix. Per capita tea use increased from 0.58 pounds in 1960 to 0.71 in 1970 and 0.80 pounds in 1975. Since 1980 tea consumption has declined from 0.78 pounds to an estimated 0.76 for 1983, reflecting competition from herbal teas, and to some extent soft drinks. The tea industry continues to innovate with products such as liquid tea beverage marketed in six-packs, and flavored teas such as orange, cinnamon, spice, etc. Tea is being consumed in more different forms, flavors, and containers than ever before.

Retail tea prices increased somewhat in 1983. A package of 48 tea-bags cost \$1.70 in September, up from \$1.65 a year earlier. Reflecting a larger world crop, wholesale tea prices in 1983 declined from a high of 98.5 cents a pound in January to 87 cents in July and then increased slightly to 91 cents in August (average London Auction prices converted to U.S. dollars--latest month available). Even so, the wholesale price was slightly higher this year, averaging 91 cents a pound during January-August, up from 86 cents for the first eight months of 1982. The strong U.S. dollar has shielded domestic tea prices from increases in world prices expressed in English currency. With world tea production increasing, but less than consumption, tea prices at wholesale will likely face some slight upward pressure in the near future.

## COCOA AND CHOCOLATE

Total imports of cocoa and chocolate totaled nearly 770 million pounds (bean equivalent) for the first eight months of 1983, up almost 50 percent from a year ago as manufacturers moved to replenish stocks that had been reduced by the drop in 1982 imports. Cocoa bean imports of 418 million pounds were up nearly 40 percent from last year. Imports of semiprocessed cocoa and chocolate products totaled 339 million pounds, a rise of over 55 percent. Imports of consumer products of 12 million pounds, while relatively small, were up considerably from 8 million. Among semiprocessed cocoa products, imports of unsweetened chocolate at 87 million pounds, were up 65 percent; cocoa butter, at 102 million, rose 50 percent; and imports of unsweetened cocoa powder, at 143 million, were also up 50 percent. Imports of semiprocessed and consumer products together continue to grow and in 1983 could account for over 40 percent of U.S. consumption, with the domestic corn grind supplying the remainder.

Based on the trend in domestic consumption so far this year, total use of cocoa and chocolate products will probably increase slightly from 1982's 877 million pounds. Per capita consumption is likely to increase to 4 pounds or more (bean equivalent) from 1982's 3.8 pounds. The cocoa bean grind totaled 310 million pounds for the first 9 months, down only 5 percent from a year ago despite the sharp increase in imports of semiprocessed and consumer products. Two national companies are promoting new products including their own brands of chocolate milk. Advertising, promotion, and relatively stable retail prices of various cocoa and chocolate products seem to have stimulated chocolate consumption this year, though U.S. stocks are apparently increasing as well.

New York cocoa bean prices (the average of the nearest-three active futures trading months on the Coffee, Sugar & Cocoa Exchange) increased from 78 cents a pound in January average to nearly a dollar a pound during June-August. Since then prices have declined somewhat because of prospects for a 7 percent larger world cocoa crop. Cocoa prices which had been declining yearly since 1977, turned around in 1983 as the 1982/83 crop was below consumption levels. Cocoa prices are expected to range between 90 cents and \$1.00 a pound over the next few months and average around 90 cents in 1983. Cocoa bean prices averaged 74 cents a pound in calendar 1982.

U.S. imports of cocoa and products in the first 8 months of 1983 totaled about \$590 million, up from \$460 million the previous year. The value of cocoa beans increased from \$235 million to nearly \$300 million while imports of semiprocessed and consumer products rose from \$225 million to \$290 million. U.S. imports of cocoa and products could total over \$850 million this year, nearly 25 percent over 1982's \$684 million.



## HFCS COMPETITION--A YEAR OF TRANSITION

THE TOPIC THAT I HAVE BEEN ASKED TO DISCUSS IS COMPETITION IN THE HFCS MARKET. THIS WOULD HAVE BEEN A MORE EXCITING TOPIC AT LAST YEAR'S OUTLOOK CONFERENCE. AT THAT JUNCTURE, SURPLUS CAPACITY WAS SUBSTANTIAL IN THE CORN WET MILLING INDUSTRY SINCE ADDITIONAL FACILITIES HAD BEEN BROUGHT ON STREAM IN ANTICIPATION OF FURTHER INCREASES OF SOFT DRINK APPROVAL RATES FOR HFCS AS A REPLACEMENT FOR REFINED SUGAR. SPOT PRICES FOR HFCS WERE ERODING SHARPLY, WHILE FORWARD CONTRACTING AT DEPRESSED PRICES WAS RAMPANT. THE ONLY GOOD NEWS IN THE INDUSTRY'S OUTLOOK WAS THE DEPRESSED LEVEL OF CORN PRICES. YET, LOW NET CORN COSTS ONLY SERVED TO ACCELERATE THE EROSION OF HFCS SELLING PRICES, WHICH REFLECTED THE INTENSELY COMPETITIVE MARKET ENVIRONMENT. CLEARLY, THE OUTLOOK FOR 1983 SEEMED EXTREMELY PESSIMISTIC, AT THIS JUNCTURE, A YEAR AGO.

HFCS SHIPMENTS IN 1982 APPROXIMATED 6.2 BILLION POUNDS. THE GROWTH OF DEMAND FROM EXISTING CUSTOMERS SEEMED LIKELY TO BOOST HFCS SHIPMENTS TO THE 6.6 BILLION POUND AREA IN 1983. YET, GIVEN IN-PLACE ANNUALIZED CAPACITY OF ROUGHLY 8.5 BILLION POUNDS, WHICH WOULD HAVE TRANSLATED INTO A 77.6% CALENDAR 1983 OPERATING RATE, THE POTENTIAL FOR CONTINUED INTENSE COMPETITION WAS SIGNIFICANT.

CLEARLY, THE AFOREMENTIONED CONSIDERATIONS ARE NO LONGER PERTINENT. CALENDAR 1983 IS AN IMPORTANT TRANSITION PERIOD FOR THE CORN WET MILLING INDUSTRY. BEFORE THE OUTLOOK CAN BE DISCUSSED, THE FACTORS THAT CONTRIBUTED TO THE 1983 TRANSITION FROM A DISMAL TO AN EXTREMELY FAVORABLE OUTLOOK SHOULD BE NOTED. THESE FACTORS ARE NOTED BELOW.



- FIVE NEW APPROVALS FOR HFCS USE IN SOFT DRINKS WERE GRANTED IN 1983. THE AGGREGATE INCREMENTAL ANNUALIZED DEMAND FROM THESE APPROVALS APPROXIMATES 1.2 BILLION POUNDS. WHEREAS ONLY PART OF THESE INCREMENTAL SHIPMENTS WILL ACTUALLY BE EFFECTED IN 1983, WHICH REFLECTS THE TIMING OF ANNOUNCEMENTS AND PEAK SEASON SUPPLY CONSTRAINTS IN THE SECOND-GENERATION HFCS MARKET, IT NOW SEEMS LIKELY THAT CALENDAR 1983 SHIPMENTS WILL APPROXIMATE 7.32 BILLION POUNDS. THUS, THE HFCS OPERATING RATE WILL APPROXIMATE 86.1% IN 1983.
- WE ESTIMATE THAT HFCS SHIPMENTS WILL INCREASE TO A MINIMUM OF 8.08 BILLION POUNDS IN 1984, EVEN IF NO FURTHER EXPANSION OF OF HFCS APPROVED SUBSTITUTION RATES IN SOFT DRINKS ARE GRANTED. HENCE, THE HFCS OPERATING RATE SHOULD APPROXIMATE 94.3%.
- DEMAND GROWTH FOR ETHANOL HAS SURGED, WHICH IS AN ALTERNATE USE OF STARCH SLURRY IN CORN WET MILLING PLANTS. IN 1982, ETHANOL SHIPMENTS FOR FUEL USE ROSE 180% YEAR-TO-YEAR TO 210 MILLION GALLONS. WE ESTIMATE THAT THESE SHIPMENTS WILL INCREASE ROUGHLY 80% TO THE 375 MILLION GALLON AREA IN 1983. CORN WET MILLERS SHOULD ACCOUNT FOR ROUGHLY 78% OF TOTAL ETHANOL SHIPMENTS.

IN ESSENCE, THE LEVEL OF COMPETITION THAT SHOULD PREVAIL IN THE HFCS MARKET SHOULD EASE CONSIDERABLY IN FUTURE YEARS FROM THE INTENSELY COMPETITIVE ENVIRONMENT THAT CHARACTERIZED THE INDUSTRY FROM LATE 1981 THROUGH EARLY 1983. THIS EASING OF COMPETITION SHOULD ENABLE THE SPREAD BETWEEN HFCS PRICING AND REFINED SUGAR PRICES TO NARROW CONSIDERABLY IN 1984.

WE EXPECT TOTAL HFCS CAPACITY TO INCREASE MODESTLY IN 1984 TO 8.55 BILLION POUNDS FROM 8.4 BILLION IN 1983. HOWEVER, SOME SHIFTING OF PRODUCTION TO THE SECOND-GENERATION MARKET FROM FIRST-GENERATION HFCS OUTPUT IS LIKELY. WE ESTIMATE THAT ABOUT 50% OF HFCS CAPACITY WAS ALLOCATED TO FIRST-GENERATION PRODUCTION STREAMS IN CALENDAR 1983. YET, THIS ALLOCATION SHOULD DECLINE TO 45% IN 1984. THUS, DESPITE A MODEST YEAR-TO-YEAR INCREASE OF TOTAL AVAILABLE CAPACITY OF HFCS, FIRST-GENERATION CAPACITY SHOULD ECLINE ALMOST 10% YEAR-TO-YEAR. THUS, UNLIKE CALENDAR 1983, SUPPLY AVAILABILITY OF BOTH FIRST AND SECOND GENERATION HFCS SHOULD BE CONSTRAINED DURING THE 1984 DEMAND PEAK PERIOD.

OUR ESTIMATES ASSUME A 760 MILLION POUND YEAR-TO-YEAR INCREASE OF AGGREGATE HFCS DEMAND IN 1984. THIS ESTIMATE ASSUMES A 80 MILLION POUND INCREASE OF FIRST-GENERATION HFCS DEMAND, WHICH SHOULD LARGELY REFLECT INCREASED USE IN SELECTED DAIRY PRODUCTS AND SPECIALTY BAKED GOODS. THE MAJOR SOURCE OF GROWTH--510 MILLION POUNDS--WOULD REFLECT THE FULL YEAR IMPACT OF NEW HFCS APPROVALS IN SOFT DRINKS THAT WERE GRANTED IN 1983, TO DATE. THE REMAINING 200 MILLION POUNDS OF INCREMENTAL DEMAND WOULD REFLECT GALLONAGE INCREASES THAT ESTABLISHED SOFT DRINKS SHOULD REALIZE.

CLEARLY, A STRONG POSSIBILITY EXISTS THAT FURTHER HFCS SUBSTITUTION APPROVALS WILL BE GRANTED FOR THE LEADING COLAS. ONLY ONE APPROVAL WOULD BE NECESSARY TO PROMPT SEVERE PEAK SEASONAL SHORTAGES IN 1984.

WE EXPECT HFCS CAPACITY TO RESUME AN UPTREND IN 1985. ON STREAM CAPACITY SHOULD INCREASE TO A MINIMUM OF 9.0 BILLION POUNDS. THIS PROJECTED INCREASE REFLECTS THE LIKELY START-UP OF A NEW FACILITY. EXPANSION PROGRAMS AT EXISTING PLANTS COULD ENABLE INDUSTRY-WIDE CAPACITY TO ADVANCE TO THE 9.5 BILLION POUND AREA. THIS EXPANSION WOULD BE DERIVED FROM EXPANSION OF GRIND CAPACITY AT EXISTING PLANTS, AND POSSIBLY SOME CANNIBALIZATION OF PRODUCTION FROM STARCH AND CORP SYRUP. THE UPPER PARAMETER OF OUR 1985 SUPPLY ESTIMATE IS UNLIKELY TO BE REALIZED UNLESS NEW APPROVALS FOR HFCS USE IN SOFT DRINKS ARE GRANTED BEFORE THE SECOND QUARTER OF 1984. THIS VIEW REFLECTS THE LEAD TIME THAT IS NECESSARY TO BRING NEW GRIND CAPACITY ON STREAM.

THE DEXTROSE (DEX) MARKET HAS BEEN THE ONLY CONSISTENTLY BALANCED SEGMENT OF THE CORN WET MILLING COMPLEX. THIS BALANCE HAS EMERGED SINCE THE LATE 1977 SHUT-DOWN OF SOME INEFFICIENT SURPLUS CAPACITY. RAPID EXPANSION OF DEMAND FROM BREWERS FOR USE OF DEXTROSE IN LIGHT BEERS HAS SERVED TO OFFSET THE CANNIBALIZATION OF BAKING INDUSTRY DEMAND BY HFCS. THE DEX MARKET'S OPERATING RATE SHOULD APPROXIMATE ITS TRADITIONAL LEVEL OF ROUGHLY 85% IN 1983. YET, AN IMPROVEMENT TO THE 89% AREA IS POSSIBLE IN 1984 SINCE THE IMPROVED ECONOMIC ENVIRONMENT SHOULD BOLSTER DEMAND, ESPECIALLY IN NON-FOOD USES.

IN 1983, THE CORN SYRUP (CSU) MARKET IS THE ONLY SECTOR OF THE CORN SWEETENER COMPLEX THAT HAS CONTINUED TO EXPERIENCE SURPLUS CAPACITY, ALBEIT RELATIVELY MODEST. OWING TO THE ENTRY OF A NEW PRODUCER--MINNESOTA GRAIN PROCESSORS--INTO THE CORN SYRUP MARKET, AND VIRTUALLY FLAT DEMAND YEAR-TO-YEAR, THE 1983 OPERATING RATE HAS SLIPPED TO THE 79.5% AREA FROM 81.0%. WE DEMAND TO INCREASE MODESTLY IN 1984. HOWEVER, DIVERSION OF



GRIND CAPACITY TO OTHER MARKETS SHOULD ENABLE THE OPERATING RATE TO IMPROVE CONSIDERABLY TO THE 85% AREA. CONCURRENTLY, A MEANINGFUL IMPROVEMENT OF PRICING SHOULD EVOLVE.

THE IMPROVEMENT OF THE HFCS SUPPLY/DEMAND SITUATION HAS CAUSED SPOT PRICING FOR BOTH FIRST AND SECOND-GENERATION TO INCREASE SHARPLY FROM THE FIRST QUARTER 1983 LOWS. THE INCREASE HAS BEEN ESPECIALLY NOTEWORTHY FOR THE SECOND-GENERATION PRODUCT, WHICH HAS MORE THAN DOUBLED IN PRICE. FURTHER, OWING TO THE TIGHT SUPPLY SITUATION THAT HAS EMERGED, WE EXPECT AN UNUSUALLY MODEST LEVEL OF OFF-SEASON DISCOUNTING TO EVOLVE IN 1983 AND 1984. MANY MAJOR INDUSTRIAL USERS WILL NOT FEEL THE FULL IMPACT OF THE IMPROVED SUPPLY/DEMAND SITUATION UNTIL 1984, HOWEVER, FROM A PROCUREMENT COST STANDPOINT. OUR SURVEYS OF BOTH HFCS PRODUCERS AND USERS SUGGEST THAT LESS THAN 40% OF THIRD QUARTER 1983 SHIPMENTS WERE ACTUALLY PRICED AT THE SPOT LEVEL, WHICH REFLECTS DEPRESSED PRICE FORWARD CONTRACTS THAT WERE ENTERED INTO IN LATE 1982 AND EARLY 1983. THIS PERCENTAGE SHOULD INCREASE TO AN ESTIMATED 55% IN THE FOURTH QUARTER. THUS, THE FULL IMPACT OF IMPROVED SPOT PRICING ON CUSTOMERS' EFFECTIVE COSTS WILL EVOLVE IN EARLY 1984. WE EXPECT FORWARD COVERAGE PRICING LEVEL IN 1984 TO APPROXIMATE CURRENT SPOT QUOTATIONS. IN OUR OPINION, PEAK SEASON 1984 PRICES WILL EXCEED CURRENT SPOT LEVELS BY \$1.00-\$2.00 PER CWT

IN ESSENCE, THE OUTLOOK FOR HFCS HAS SHIFTED FROM A MEANINGFUL SURPLUS AVAILABILITY SITUATION TO PERIODIC SHORTAGES. THREE FACTORS HAVE BEEN RESPONSIBLE FOR THIS CHANGE OF THE SUPPLY/DEMAND SITUATION. FIRST, RAPID HFCS SHIPMENT GROWTH. SECOND, A SLUGGISH RATE OF IN-PLACE CAPACITY EXPANSION. THIRD, DEVELOPMENT OF ALTERNATE USES OF STARCH SLURRY STREAMS THAT WERE PREVIOUSLY FULLY DEDICATED TO HFCS OUTPUT. AT THIS JUNCTURE,



SOME MENTION OF EACH OF THESE FACTORS ON A LONG-TERM BASIS SEEMS PERTINENT

- WE EXPECT RAPID HFCS SHIPMENT TONNAGE GROWTH TO PERSIST FOR ANOTHER SEVERAL YEARS. GIVEN THE POTENTIAL FOR 100% SUBSTITUTION OF REFINED SUGAR IN SOFT DRINKS, WE BELIEVE THAT TOTAL HFCS SHIPMENTS COULD APPROXIMATE 10.5 BILLION POUNDS BY 1988. THIS VIEW ALLOWS FOR A SECULAR DECLINE OF THE CALORIC SOFT DRINK MARKET AT A RATE OF ROUGHLY 2% PER YEAR DUE TO THE ACCELERATION OF THE RAPID GROWTH THAT THE DIET SECTOR IS ALREADY ACHIEVING, WHICH WE EXPECT TO BE PRECIPITATED BY INCREASED USE OF ASPARTAME.
- THE HFCS MARKET IT SHOULD BE NOTED WAS EXPANDING RAPIDLY EVEN DURING THE PERIOD OF SURPLUS CAPACITY. WE ESTIMATE THAT HFCS SHIPMENTS INCREASED 13.0% AND 19.2% YEAR-TO-YEAR IN 1981 AND 1982, RESPECTIVELY. HENCE, SURPLUS CAPACITY WAS SOLELY A FUNCTION OF TOO RAPID DEMAND GROWTH.
- WE DO NOT EXPECT SURPLUS CAPACITY TO BE RESUMED. MOST ADDITIONAL PRODUCTION WILL BE DERIVED FROM EXPANSION OF EXISTING FACILITIES, RATHER THAN NEW PLANTS. HENCE, INDIVIDUAL INCREMENTS TO CAPACITY SHOULD PROVE SUFFICIENTLY SMALL TO OBVIATE A RECURRENCE OF SURPLUS CAPACITY.
- THE CORN WET MILLING INDUSTRY'S DEVELOPMENT OF ALTERNATE USES OF STARCH SLURRY SHOULD HELP TO REDUCE THE POTENTIAL FOR SURPLUS HFCS CAPACITY. WE ESTIMATE THAT 925 MILLION POUNDS OF CURRENT HFCS CAPACITY CAN BE DIVERTED TO ETHANOL OUTPUT. THIS DIVERSION CAPABILITY COULD APPROACH 1.9 BILLION POUNDS IN TWO YEARS, ESPECIALLY IF INCREASED FEDERAL GASOLINE TAX EXCISE EXEMPTIONS

FOR ETHANOL ARE INCREASED. INCREASED SWING GRIND CAPACITY THAT CAN BE USED FOR EITHER ETHANOL OR HFCS OUTPUT IS LIKELY TO LESSEN THE SEASONAL INFLUENCE OF DEMAND ON HFCS PRICING OVER TIME. REFLECTING THIS RELATIONSHIP, WE HAVE DURING THE PAST YEAR SHIFTED OUR PRICING ESTIMATES TO A MONTHLY HFCS SUPPLY/DEMAND MODEL, WHEREAS AN ANNUAL MODES WAS PREVIOUSLY UTILIZED.

- ETHANOL IS LIKELY TO REPRESENT ONLY THE FIRST PRODUCT THAT IS A SWING USE OF HFCS GRIND CAPACITY. SEVERAL CORN WET MILLERS ARE STUDYING THE VIABILITY OF CHEMICAL FROM CARBOHYDRATE OPERATIONS AS AN ADJUNCT TO HFCS FACILITIES. WE EXPECT THE FIRST COMMERCIAL SCALE CHEMICAL PLANT TO BE ON STREAM BY EARLY 1986.
- DESPITE THE PROSPECTIVE SHARE GAINS OF DIET SOFT DRINKS, HFCS TONNAGE SHOULD INCREASE RAPIDLY. YET, OUR PROJECTION OF A 10.5 BILLION POUND MARKET BY 1988 MAY PROVE UNDULY PESSIMISTIC. SEVERAL SOFT DRINK COMPANIES ARE REPORTEDLY DEVELOPING "LIGHT" PRODUCTS THAT ARE BLENDS OF THIRD-GENERATION (90%) HFCS, AND ASPARTAME. THESE PRODUCTS WOULD HAVE ABOUT 35 CALORIES PER 12 OUNCE SERVING. CONSUMER TEST MARKETING OF THE FIRST OF THESE PRODUCTS COULD BEGIN BY LATE 1984. BECAUSE MOST CORN WET MILLERS ALREADY PRODUCE THIRD-GENERATION HFCS, WHICH IS BLENDED WITH FIRST-GENERATION HFCS TO PRODUCE THE SECOND-GENERATION PRODUCT, COMMERCIAL AVAILABILITY IN COMMERCIAL QUANTITIES WOULD NOT BE DIFFICULT TO REALIZE.

CLEARLY, CALENDAR 1983 REPRESENTS A TRANSITION PERIOD FOR THE HFCS MARKET ON A SHORT-TERM BASIS SINCE THE PACE OF SOFT DRINK DEMAND GROWTH HAS

ACCELERATED. YET, WE BELIEVE THAT THE MORE DYNAMIC CHANGES ARE THOSE THAT WILL BE REALIZED ON A LONG-TERM BASIS.

## ELECTRONIC MARKETING DEVELOPMENTS

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Electronic technology is changing the way we live. In just five years we have experienced the commercial availability of 24-hour electronic tellers, cordless telephones, and sophisticated home appliances with "brains". Our society is entering the "Information Age", an age that thrives on the rapid delivery of accurate and timely information. Rural areas often lag behind in the adoption of new technology, but that will not be true in the Information Age. Farms and rural businesses, for example, can now receive instant price reports from major markets, delivered to their office computer via satellite, for about \$200 a month. Electronic marketing, my topic for today, is only one of several other examples.

Electronic marketing is the application of electronic communication technologies to the marketing process, enabling several buyers and sellers to participate simultaneously in a centralized market while remaining in their offices. From this definition of electronic marketing, I exclude a single buyer and seller negotiating a private sale by telephone. On the other hand, I include a multi-party connection, or conference call, as used in a teleauction.

A teleauction connects an auctioneer with several distant buyers. This relatively simple technology, using common telephones, has been applied to marketing since 1962. The Ontario (Canada) Pork Producers Marketing Board has used a teletype system since 1961 to conduct a descending, or Dutch, auction with major meat packers. In 1975, the Plains Cotton Cooperative Association began using a large mainframe computer and several remote terminals to create an electronic market for cotton. Today, this TELCOT system simultaneously connects about 50 buyers with about 400 local cotton gins where producers offer their cotton for sale. Producers can choose to sell by auction, firm offer, forward contract, or Commodity Credit Corporation loan. The National Electronic Marketing Association (NEMA), formerly the Eastern Electronic Marketing Association, uses remote access to a mainframe computer to sell slaughter lambs,

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fed cattle, feeder cattle, and slaughter hogs. NEMA, purchases access to a multiuser time-share network, and has been operating since 1980. Still another approach was initiated in 1978 when a Montana firm began using video tape as a means of bringing several head of cattle to a group of buyers. The video buyers currently congregate at a few fixed locations, but in the future they may see the animals on a home or office TV screen and bid over some type of electronic system. Actually, all of these basic types of electronic markets -- teleauction, teletype, computerized, and video--will continue to evolve as the technology continues to be developed and people desire to improve their marketing systems.

I have very briefly described the above systems as a convenient way of defining what is electronic marketing. This list is not intended to be complete. I refer you to a list of references at the end of my paper for more details and for descriptions of other systems. Except for TELCOT, electronic markets are all relatively small and trade less than five percent of a commodity sold in the United States.

My main purpose in this paper is to make some generalizations concerning what we have learned about electronic markets. A number of fairly consistent results have appeared. These are grouped into three categories: benefits, costs, and other factors. I will conclude my talk with some guesses about the future.

### Benefits

We have observed six benefits to buyers and sellers. These include improvements in market information, marketing efficiency, pricing efficiency, competition, price level, and market access.

### Improved Market Information

Information acts as an essential lubricant that reduces costly friction in the market place. It facilitates the matching of traders by apprising buyers of potential sellers and vice versa. It improves the process of negotiating prices and terms of trade, and of arranging for transportation, storage, and financing. Most criticisms of agricultural markets in the last decade have been aimed at imperfections in market information. Charges of price inaccuracy, incompleteness, bias, and outright deceit have been common.

One of the most obvious characteristics of electronic markets is their information generating capability. Trading is

by standardized descriptions and operating procedures rather than by personal inspection and individual trading arrangements. Therefore, standardized information on product offerings and terms of trade are readily available and can be closely related to prices. In computerized markets, market information can be summarized and delivered almost instantly and it can be done automatically for a large number of trades. Few doubts exist concerning the accuracy of this information. In fact, our experience tells us that many more people are interested in accessing electronic markets to obtain information based on other people's trades than are willing to bear the additional costs of actually completing transactions in the market. This phenomenon also is true of traditional central markets. We still need to find ways to make all information users bear their fair share of the costs.

#### Increased Marketing Efficiency

Electronic markets enable sellers and buyers to remain in their offices while making an instant search for all eligible trades, entering into selected transactions, and arranging relatively direct movement of products from sellers to buyers. In most electronic livestock markets, for example, animals stay in the feedyard until after the sale and move quickly to the buyer. Physical movement of products and traders is typically less costly in an electronic market than in most conventional marketing systems, especially terminal and auction markets where products and buyers assemble in one location and the products are subjected to much stress and handling before they are redistributed after the sale. Even country marketing requires several buyers to travel to find and evaluate products for sale. A single lot may be viewed by several buyers, whereas an electronic market requires only one person to evaluate and describe a lot for all buyers, and sometimes the producer can do it himself. Electronic markets appear to be most successful in fringe production areas where trading opportunities are few and widely dispersed and searching costs are relatively high.

#### Greater Pricing Efficiency

Pricing efficiency is a measure of how quickly and how accurately prices reflect true market value for a specific product at a specific location and a specific point in time. It is a measure of how quickly and accurately prices reflect changes in market conditions. Pricing efficiency is difficult to measure objectively because true market conditions seldom are known. However, some aspects of pricing efficiency can be measured in terms of price differentials due to differences in transportation, storage, and product quality. In an efficient

pricing system, price differentials will reflect the cost of moving a product from one place to another, the cost of storage, or the cost of substituting a product of one quality for another.

### Increased Competition

A major objective of electronic markets is to increase effective competition among the buyers of farm products. This is accomplished by exposing those products to a larger number of buyers and creating trading procedures that facilitate competitive interaction. In conventional markets farmers seldom have bids from more than two or three buyers; often it is just from one. Electronic markets enable distant buyers to gain access electronically, thereby creating a competitive market. Typically, 15 or more buyers are included in electronic markets. The computerized lamb sales regularly have 8 to 10 buyers compared with just one or two in conventional markets. TELCOT has more than 50 regular buyers.

### Higher Prices

Probably the most wide-spread and consistent result of electronic markets is higher market prices. Virtually all electronic trading of livestock has resulted in price increases of \$1.00 to \$3.00 a hundredweight. As much as \$10.00 hundredweight was achieved at times in the lamb market.

Increased prices are the result of increased buyer competition and increased marketing efficiency. To the extent that the electronic remote buying process reduces buyers' costs, at least some of the savings can be bid into the prices paid to producers. The competitive nature of the market makes it more likely that some of these savings are passed onto the seller.

### More Equitable Market Access

Both buyers and sellers can have greater access to the electronic market than conventional markets. The large number of potential market participants and the impersonal nature of trading diminish the influence of size, status, and other characteristics of an individual trader that could give an advantage in more traditional markets. Remote access via electronic communication diminishes the disadvantages of distant traders, and all traders have equal access to the market information developed by the system. Furthermore, an electronic market encourages producers with smaller offerings to combine with other sellers prior to the sale and thereby gain the advantage of selling in truckload (or larger) lots. While electronic markets facilitate market access by all traders,



electronic markets facilitate market access by all traders, smaller and more geographically remote traders appear to gain the most.

### Costs

The success of an electronic market depends on the level of net benefits to traders, that is, benefits minus the costs of obtaining those benefits. The costs include the development costs and associated risks, implementation costs, operating costs, and displacement (or social) costs.

### Development Costs and Risks

Development costs and risks increase with the sophistication of design of an electronic market. Teleauctions are the simplest form. They do not require any special equipment, and the amount of investment at risk is often just the time volunteered by the designers. The major development costs are those of forming a marketing organization, developing workable operating procedures, and arranging for necessary marketing services. Computerized exchanges, on the other hand, are the most expensive to develop because of the cost of writing computer instructions, or software. This cost increases as the designers adopt more complicated price discovery processes and provide more automated price reporting, recordkeeping, and other services. More than a million of dollars have been spent developing, testing, and modifying a computerized electronic exchange.

At the present time, we have some very workable computerized systems for cotton and livestock. Additional electronic markets for these commodities probably could be designed and implemented relatively quickly and inexpensively. A system for other commodities, such as grain, which is now under study, will require considerably greater resources.

From a developer's perspective, the risk associated with designing an electronic market includes the possibility of designing a market that buyers and sellers will refuse to patronize, or one that requires considerable modification before they will patronize it. We have found that this risk can be significantly reduced if prospective buyers and sellers are involved in designing the system.

### Implementation Costs

The process of adoption for any innovation requires that



people perceive it to have value and that they be trained how to use it. The perceived value of an electronic market will depend on several factors, including how well buyers and sellers are satisfied with their existing markets and how well they understand the electronic market. Many buyers and sellers understand the problems of existing agricultural markets, but they need to learn about electronic markets to know whether marketing improvements are possible. A large number of buyers and sellers must be informed and trained, and then be willing to use an electronic market before it will have sufficient volume to generate significant benefits. The Extension Service, Agricultural Marketing Service, and other agencies have provided much of the educational effort. As electronic markets become more commercial, more of these costs will be borne by the developers. Hopefully, we already have increased the level of basic understanding.

The developers have paid and will continue to pay the cost of market support necessary to "make a market." That is, they sometimes act as a "buyer of last resort" when sellers want to participate but the regular buyers do not bid market level prices. Likewise, the developers sometimes offer product for sale when the buyers are willing but the sellers are dragging their heels. Market support is a common implementation cost that makes a market which provides reluctant buyers or sellers an opportunity to see the market work.

Buyers and sellers have many reasons for not participating in an electronic market. Some of these have been proved to be of little substance. For the most part, they are myths that can be corrected by education. Some of these myths are: 1) agricultural products cannot be adequately described; 2) an electronic market is too impersonal; 3) computers are too complicated; 4) computers cannot be trusted; and 5) computer operators cannot be trusted.

Other concerns of buyers and sellers are very real. They do not want to break established trading relationships, especially if the electronic market might fail and they might not be accepted back into those old relationships again. Some potential traders have been lured away from the electronic market by temporarily better prices elsewhere. Some have been threatened and warned not to participate. In these circumstances, buyers and sellers are not easily convinced to try an electronic market.

#### Operating Costs

The cost of operating an electronic market is very sensitive

to the type of electronic equipment employed and the volume of products traded. A teleauction does not use any special equipment and has almost no fixed cost. The cost of a conference call is incurred only when used. A teleauction is cost-effective for markets with relatively few participants and a small volume of transactions--something in the neighborhood of 10-15 traders and sales of less than an hour a week. Beyond these limits, a computerized system is superior in service and lower in cost. The exact operating cost will depend on how the system is designed and used.

A computerized electronic market has two major components: host computer and a communications network. There are several alternatives for each, thus yielding several combinations, each adopted to the requirements of a specific market situation.

The host computer may be dedicated to the electronic market application or time-shared with other users. If it is dedicated, it may be owned or leased. Communication networks include terrestrial telephone lines, satellite or microwave transmission. The terrestrial service may be conventional dial-up, a timeshare network, or dedicated lines.

Cost comparisons among different types of electronic markets are difficult to make because of differences in equipment, market conditions, and other factors. Helmreich and Epperson solved this problem by simulating the cost of three types of computer applications to the same set of market conditions. They examined the use of a leased, owned, and time-shared computer under four levels of market penetration for a multicommodity market in Southwest Georgia. The time-shared system was consistently the least cost alternative, but as market share increased from 3 percent to 75 percent, the relative advantage of the time-shared system diminished (table 1). In regions with greater potential volume of products, like the Midwest, the advantage of a time-shared system may disappear.

Helmreich and Epperson also compared the three computer systems with a telephone system on a per unit basis at the 15 percent market penetration level. Their analysis shows the time-shared system again to be the least costly. The cost of the telephone system is quite similar to the cost of an owned or leased computer system (table 2).

### Displacement Costs

The cost of unemployed market agencies, facilities, and personnel does not have a direct impact on the feasibility of an

electronic market because in a free enterprise economy someone else bears these costs. However, recognition of whose ox is being be gored and how badly will help the innovator judge the magnitude of resistance he is likely to experience as he tries to implement an electronic market. It is common to experience resistance to an innovation like this. It is a threat, or a perceived threat, to the incomes of those engaged in conventional marketing systems.

### Other Factors

#### Established Trading Practices

Resistance to an electronic market can be reduced by minimizing the disruption of established trading practices. Because the primary function of an electronic market is to improve communications, many trading practices can be left in tact and only changed as the industry is ready to accept them. If, for example, packers are accustomed to buying hogs before 10:00 a.m., design a market that gets them sold by 10:00 a.m. unless you have a convincing argument for changing that practice. If facilities are needed to weigh livestock and assemble them into truckload lots, encourage existing stockyards to be part of the system. We also found a need to be sensitive to terminology used, method of payment, and individual desires not to do business with certain financially unstable firms.

#### Innovations

At the same time, there is plenty of opportunity to be innovative. Computers, for example, can be programed to do a number of chores. They can keep detailed trading accounts for individuals. Cotton merchants appreciate this service on TELCOT, because it saves them hours of clerical time, is extremely accurate, and is instantly available. Cash flow accounts can be kept. Individual bidding strategies can be entered and automatically executed when pre-specified market conditions arise. Electronic funds transfers can be arranged. Transportation services can be bought and sold electronically, too. A number of new services could be adopted to make marketing systems more efficient and more effective.

#### The Future

Because this is an outlook conference, I would be in error if I did not speculate on the future of electronic marketing. I feel it is only a matter of time before the electronics revolution will infiltrate the field of agricultural marketing. We already have rapid communication of market information by



computers and satellites, computerized recordkeeping and accounting systems, and so forth. The equipment is being put in place to handle a number of routine processes on farms and ranches and in marketing, processing and retailing firms. The addition of marketing, that process of matching buyers and sellers, will be a very natural step.

Electronic markets are most likely to be developed between the first handler and processor/merchant level of the market channels. The dispersed nature of agricultural production and the lack of real competition in country markets will encourage the development of electronic markets at this level. Most producers will not enter the market directly until they have enough volume to offer a truckload lot of uniform product for sale at one time.

Table 1. Projected computer costs for a multicommodity electronic market in Southwest Georgia

Computer System	Level of Trade			
	3%	15%	50%	75%
	----- Annual Dollar Expense -----			
Leased	\$218,587	\$352,405	\$429,793	\$475,832
Owned	206,921	327,002	403,117	448,257
Time-shared	44,584	118,990	270,666	384,989

Helmreich and Epperson

Table 2. Projected cost of alternative computerized marketing systems and a telephone system for 15 percent of Southwest Georgia Market for selected commodities.

Commo- dity	Unit	-----Cost/Unit-----			
		Tele. Syst.	Owned Computer System	Leased Computer System	Time-shared Computer System
Corn	bushel	4.0c	3.6c	3.8c	2.0c
Soybeans	bushel	5.0c	4.7c	4.9c	2.1c
Feeder Cattle	head	\$5.00	\$6.60	\$6.84	\$4.63
Slaughter Hogs	head	\$1.25	\$1.41	\$1.44	\$1.16

Helmreich and Epperson



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Dan Davis. "TELCOT: From Commercialization to Industrywide Implementation"

Peter Curtin. "Development of the American Meat Exchange"

Dean Baldwin. "Slaughter Hogs"

Lee Schrader. "Eggs"

Thomas L. Sporleder. "Feeder Cattle"

Roy Davis. "Slaughter Cows"

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For most of this century, USDA has been heavily involved in assessing the quality of cotton produced in the United States. About 98 percent of each year's crop carries an official USDA grade. A significant portion of the crop is traded sight unseen with traders relying solely on the USDA grade to establish the price at which the cotton will be traded.

Until recently, the method of assessing the quality of cotton had changed very little over the years, relying primarily on the human senses of touch, sight and smell. However, in order to put the cotton to its best end use and to minimize processing difficulties, manufacturers need to know more about the cotton than the human senses can tell them so the information provided by the USDA grade has been supplemented to some degree with quality information obtained from laboratory tests. The slow speed and high cost of laboratory tests limit their usefulness in selecting individual bales of cotton for optimum mill mixes, giving rise to the need for laboratory type instruments that are faster and more economical to use. Several years ago, USDA undertook an assignment to develop such instruments and as a result, we now have high volume, precision instruments (HVI) capable of measuring five of the six quality factors considered most important in the manufacturing process. The five factors are: length, strength, color, micronaire and length uniformity. The sixth factor is trash, for which we do not yet have a rapid measuring device but research and development is underway and we expect to have a working model before too long. The relatively high speed and low cost at which these instruments can be operated make it practicable to use them in measuring the quality characteristics of every 500 lb. bale of cotton produced. Those measurements can be made while the cotton is still in the grower's possession, allowing the entire marketing chain to benefit from the additional quality information provided.

The importance of the six quality factors as identified by manufacturers is confirmed by spinning data developed at our AMS laboratory in Clemson, which show that a change in the quality of any of the six fiber properties will cause a change in the spinning efficiency of the fiber or in the quality of the end product. In our laboratory evaluation, the degree of change attributable to each quality factor was obtained by using regression equations. We determined the combined effect of all quality changes in the fiber properties as measured by the HVI and by the traditional class upon a given yarn property or spinning process and then compared the ability of the two grading systems to predict the quality of the yarn to be produced or the spinning efficiency of the fiber. This information is presented below.

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Yarn Property	Percent of Change in Yarn Quality Explained by:			Predictability of Yarn Quality Improved By:
	Traditional	HVI Class 2/		
	Class 1/ (%)	(%)		(%)
Yarn Strength	58	82		41
Spinning Potential	57	79		39
Yarn Appearance	23	33		43
Yarn Neps	21	30		43
Waste	43	48		12

1/ Combined effect of grade, staple and micronaire.

2/ Combined effect of length, length uniformity, strength, micronaire, color and trash (trash by visual assay).

For example, by using the HVI system, it is possible to improve the predictability of yarn strength by 41 percent over the traditional method of cotton classing. The remaining variation unexplained by HVI measurement is due to quality factors not measured, and variations in cotton fiber and processing equipment.

These figures clearly show the superiority of the HVI system over the traditional in predicting manufacturing results.

Fiber length is the only component of both classing systems where a direct comparison of quality measurements can be made. One way of making this comparison is to examine the Lamesa (HVI) and Lubbock (traditional) length statistics for the 1980 crop. This data is shown below:

Comparison of Lamesa and Lubbock  
Fiber Length Statistics, 1980 Season

<u>Fiber Length</u> (32nds)	<u>Lamesa</u> (Pct of Crop)	<u>Lubbock</u> (Pct of Crop)
28 & Shorter	3	0
29	8	2
30	16	8
31	23	24
32	16	38
33	12	19
34	8	6
35	7	2
36	5	1
37	2	0
Average length (32nds)	31.9	31.9



Historically, these two territories are quite similar in fiber length. Note that the average length is the same in this particular year for both areas. However, the HVI called more of the fiber longer and more of the fiber shorter than did the traditional classing in Lubbock. This tends to confirm the theory held by many that with traditional class, the length as determined by the classer is biased toward the average length grown in that area.

The greatest advantage of the HVI over the traditional classing system, however, is its ability to provide information on other important quality factors, especially strength, that the traditional method cannot provide. The Plains area of Texas is not noted for its high-strength cotton but there is a lot of high-strength cotton grown in that region as indicated by Lamesa quality statistics for the 1981 crop.

Fiber Strength Distribution,  
Lamesa Area, 1981 Crop Year

<u>Strength</u> <u>(grams/tex)</u>	<u>Percent</u> <u>of Crop</u>
18-19	6
20-21	24
22-23	36
24-25	21
26-27	11
28-29	2
Average (grams/tex)	23

Since 22-23 grams per tex is considered to be average strength, one-third of Lamesa's 1981 crop was above average in strength. Note that 13 percent of the crop had strength values of 26 grams per tex or higher. This level of strength is normally associated with cotton grown in the San Joaquin Valley of California which normally commands a premium. With the HVI, the individual bales of cotton produced in West Texas with above average strength can now be identified and their owners rewarded accordingly.

1983 will be the fifth year that we have used the HVI system to class all cotton in the Lamesa, Texas area, a territory which produces about 500,000 bales of cotton annually. In 1982 we expanded HVI classing into the Altus and Lubbock areas, classing a portion of the crop in these areas by HVI. During this same period we also used the HVI in our Grading Section in Memphis as an aid in our national classing supervision program, and in our Clemson Laboratory where it is an integral part of our ongoing fiber testing and evaluation program. In 1983 we expanded HVI to all of Texas and Oklahoma and we estimate that approximately 75 percent of all the cotton produced in these two states this year will be classed by this method. HVI classing is offered to growers in these areas on a voluntary basis with the grower paying \$1.60 per bale compared to \$1.15 for the traditional class. The amount of cotton classed by HVI from its first significant year of operation in 1979 through 1983 is as follows:

Volume of Cotton Classed by HVI

<u>Crop</u>	<u>Bales Classed</u>	<u>Percent of U.S. Crop</u> (%)
1979	98,000	1
1980	306,000	3
1981	868,000	6
1982	870,000	8
1983 (estimated)	2,100,000	27

Under the traditional classing system, there is little incentive for the grower to produce a stronger or more uniform fiber. A grower producing high-strength cotton in an area generally noted for producing low strength cotton is quite likely to receive the same price as his neighbors unless there is a means of identifying the strength characteristics of each bale. Where individual bales are not so identified, buyers will protect themselves by buying cotton in that area on the basis of the average strength, or possibly even the lowest strength cotton normally produced there. In such a situation, a grower is not likely to be greatly concerned about the strength of the fiber he is growing. HVI provides the incentive growers need for producing the high-strength cotton so desired by manufacturers.

At the present time, whenever we use the HVI for classing we continue to use the classer to provide the traditional "grade". Although the HVI system provides the two major components of "grade" (color and trash), the market is not accustomed to pricing these two quality factors separately. So, for the time being, we will continue to provide a classer's grade in order to prevent a major disruption in the marketing system. However, at some point the market will need to switch to pricing these two factors separately if the benefits of instrument classing are to be fully realized.

This will be a very difficult and complex task. It will mean the abandonment of internationally-used grade standards as we now know them and the establishment of new ones. It will mean a revision of the present method for determining the value of cotton and a restructuring of CCC loan pricing mechanisms and policies.

To make these changes the entire cotton industry must become deeply involved. Toward this end, the Secretary has established an Advisory Committee on Instrument Standards. This Committee is providing systematic input from those segments of the industry directly affected.

The HVI system is proving to be a reliable, economically feasible method of classifying cotton in a production environment. Many growers have already shown their preference for the new system by having their cotton classed in this manner. Others are giving thoughtful consideration and we anticipate continued expansion. Textile mills are learning how to use HVI data in selecting their mill mixes. This learning process is being aided by a Federal-State cost-sharing project now being carried out by Clemson University, to demonstrate how HVI data can be used to maximize spinning efficiency and product quality. Similar work has been going on at Texas Tech for a number of years now, especially in the area of open end spinning.

Clear signals between the producer and the manufacturer are absolutely essential if the grower is to be responsive to the manufacturer's quality needs. The HVI classing system provides the vehicle for this vital communication. Manufacturers needing high-strength fiber can send growers a signal to produce such cotton by offering a premium. Such premiums are now being widely offered in Texas and Oklahoma where the HVI system is identifying high-strength cotton on a bale-by-bale basis and growers are responding by switching to varieties of cotton with high-strength characteristics.

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### Introduction

After 20 years in Washington, this is my first opportunity to speak at an Outlook Conference. My presentation concerns utilizing existing communications technology to speed information which can assist in marketing perishable commodities.

You have heard about electronic marketing. The fruit and vegetable industry, which we serve, has yet to show much interest in that innovation because of the numerous factors affecting price -- color, size, uniformity in pack, as well as grade or quality. Trading through computers would, of course, help in our collection of market information.

Computers are somewhat of a mystery to many of us, and I find I have as much trouble understanding terms used by the computer specialists as I do in interpreting the specialized language of economists. However, we are learning how to take advantage of some computer capability.

### Current Program

Before I discuss computerization, an outline of our current program may be helpful. Reporters must collect and analyze the information before any reports can be available. Budget problems have made it necessary to close some offices and curtail services in other ways. Hopefully, that trend will stop because the reporters in the field are basic to every piece of information released.

One of the primary products of Market News, as it applies to fruits and vegetables, is reporting the volume of marketings. We collect data on quantities entering the commercial channels in terms of shipments. Rail shipments are collected directly from the carriers. Truck and air shipments are collected largely by field offices directly from the shippers. When the rail and truck loads reach terminal markets for movement into retail stores or institutions, they are termed arrivals. In the past, they were referred to as unloads. However, because so much of the distribution does not stay in the city where it is recorded, "arrivals" seemed a more appropriate term. Railroad arrivals also are collected from the carrier, and truck arrivals from the original receivers. These data are available only in the terminal market cities where we have offices, and include supplies received by chainstores as well as wholesalers. If our budget allowed us to operate in more terminal markets, a greater percentage of the nation's arrivals could be reported.

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Computers may have the potential for collecting price data, but have not been practical to date. In some trial projects sellers entered information about transactions into the computer. This has not worked out because some buyers or sellers attempted to manipulate the information to gain an advantageous bargaining position. A similar project had been tried earlier for Poultry in Georgia, with the same results. Computers can only process the data entered. They cannot determine the validity of the information. On the other hand, market reporters are trained extensively to learn about the products, marketing practices, and the people in the industry. Efforts to mislead reporters are countered by the background and experience acquired. Verifications are accomplished as necessary to assure that all factors are considered in evaluating market conditions. Although Market News must depend upon voluntary cooperation, sufficient investigative reporting takes place each day to provide the most accurate and complete reports possible.

Dissemination by computer could be employed now. Currently, market news information is exchanged among field offices over more than 20,000 miles of leased wire system. Access to the leased wire is available to private subscribers, commercial wire services, and others who may make the arrangements directly with the telephone company. Additionally, reports are prepared especially for radio or newspaper, and in most offices, are loaded on a telephone recorder where anyone can dial a number 24 hours a day to obtain the latest report. Also, mailed reports are available on a subscription basis.

The leased wire system has become less dependable as time goes on. Either the equipment we have been using is wearing out or the service has deteriorated. Machines in various offices are out of service for longer periods than we have ever experienced in the past. In addition to providing for more timely reports, computers should help to assure reliability.

#### Plan

We plan to have market news field offices enter data directly into computer storage instead of transmitting it by leased wire. If offices can retrieve reports directly from the computer, then the information can also be made available to individuals or firms who want immediate access to it. They could subscribe to the computer service like they now arrange for a drop on the leased wire system. If market news field offices specializing in one or more commodities can request information on various markets throughout the country by commodity -- either terminal markets or competitive shipping point markets -- and obtain that information when they want it, it will save considerable duplicate typing of reports. Currently, a market news office must type a report, then type it again to enter it into the leased wire system. It is typed a third time by the receiving office where someone must first edit the leased wire copy and select the portions needed. Only one typing will be necessary in a computerized system. When the originating office prepares the report on the word processor, it can be entered into the computer for retrieval by other offices equipped with micro-processors or word processors with communicating capability. After retrieving it, an operator can place it on the screen, and format it as desired. A duplicating master can be prepared without typing. This system will eliminate considerable clerical effort and should speed release of data. At the same time, growers, private users, or

anyone needing the reports can enter the data bank and retrieve the information by selecting the commodity or market in the manner preferred. All they need is a word processor, personal computer, or other equipment capable of communicating with a computer data bank.

### Progress Report

Computerization of market news information began as a result of a cutback in appropriations. At the beginning of fiscal year 1982, it was obvious that funds were insufficient to maintain operations at the 1981 fiscal year level. Several offices were closed and in 16 others, where more than one clerical assistant was employed, one position was eliminated. A word processor was installed to help the remaining clerk. This has not been entirely successful because the word processors will not answer the telephone. Many clerks and reporters are working overtime in order to maintain service to the public. Nevertheless, we found that the word processors had computer capability. The machine selected as most cost effective at the time was the Xerox 820 which is also a micro-computer. By adding a communication modem, that equipment will communicate either with another similar machine or with a computer data bank.

In the meantime, leased wire personnel have been working with SATNET, a satellite system which could replace land lines for exchanging information. Concurrently, a computerized information service in Memphis, Tennessee, was added to that trial to see if market news data could be entered into a data bank through the satellite system. This has proven to be possible. Also, the Technical Services Division of AMS ran a test with another computer information company to test our proposal for exchanging reports through a computer data bank in lieu of leased wire. That test has not been formally evaluated by the Technical Services Division as of this date. However, the market news offices involved in the test believe it was operationally successful. The problem in finishing the evaluation, as I understand it, concerns estimating the cost. We hope that the test will be found financially feasible because the concept is the goal we seek.

We have Cooperative Agreements with 28 State Departments of Agriculture, and we are obligated to maintain an exchange of market information with offices operated by State agencies. Many of them are as important to the national program as the offices operated by Federal personnel. They must have equipment to enter and retrieve data from a computer or compatibility with the Xerox 820 to communicate directly when advantageous to the program. Until all offices -- both Federal and State -- are equipped, market information will continue to move over the leased wire.

If the concept of a computerized exchange of market information is operationally and financially feasible, there are at least two options available to establish the service. A contract with a private computer service such as Dialcom, AGNET, Market Data Systems, or other could be developed from competitive bidding. Alternatively, AMS could purchase a computer. Many factors need to be considered. We must determine whether a private contractor or government facility would be most able to keep up with the fast moving improvements in computer technology or add more computer capability to meet increased demand for reports. The question of utilizing one private contractor to process market news information at the exclusion of all others has

caused concern. Currently, market news reports move over telephone company facilities. The telephone company charges private subscribers for equipment and access to market information on lines leased to AMS. It seems conceivable that the same arrangement could be made with a commercial computer service, and if the contract with the agency resulted from competitive bidding, it should be fair to all. Charging those who want the data for computer time is comparable to renting the telephone company facilities. There could be a stipulation in the contract that the computer firm sell only the computer time.

We surely hope that all problems can be solved and that by next Outlook, market news information exchange throughout the country will be available by contacting a computer data bank.



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Valid nutrient composition data for foods, when combined with knowledge of human nutrient requirements, are the scientific basis for national and international food and nutrition policies (1). They can be used not only as an approximate assessment of the nutritional health of a population and as a measure of the nutritional value of agricultural production, but also as guidelines to define future needs of research related to production practices and of national and international food assistance programs. The importance of nutrient composition data can be discussed in five categories.

1. Assessment of the adequacy of a national diet: National food production data can be translated into per capita availability of nutrients to the population (2). Such data are useful for the assessment of dietary adequacy mainly in countries with marginal or inadequate food production, by defining the most limiting nutrients as targets for changes in production priorities and practices. Such data are of lesser value in countries with an abundant food production, such as the United States, because the amount of nutrient loss and waste before consumption is difficult to estimate. On the other hand, once a pattern of food intake has been established on the basis of individual or household food consumption surveys, the resulting data can serve as a basis for a first assessment of the nutritional status of population or its sub-groups (3). A comparison of the Recommended Dietary Allowances and Estimated Ranges of Safe and Adequate Intakes with estimated per capita nutrient intakes (Table 1) points out problem nutrients for which adequacy cannot be taken for granted (4). Further research on the nutritional status of sub-groups of the population for these nutrients is clearly warranted and consideration of enrichment policies may be indicated. The importance of nutrient composition data for this type of status assessment is best demonstrated by a negative example: No reliable nutrient composition data are available for the "new trace elements" that have been shown during the past decade to be essential in animal species and may be important in human nutrition as well. Although an approximate quantitative estimate of human requirements can be extrapolated from animal studies, it is not possible at this time to assess the adequacy of our diet with regard to these micronutrients, even in a preliminary way.

2. Nutrient data as the basis for dietary guidelines: Although the goal of research on human nutrient requirements is the identification of levels of all nutrients and their balance that are conducive to health maintenance, direct dissemination of its results to the general public in terms of optimal daily intakes of individual nutrients would be useless. The scientific measures of micrograms and milligrams per day and the many known interactions among nutrients must be translated into recommendations for food quantities, recipes, and menus that the consumer can understand and apply. Nutrient composition data are the necessary medium for translation of nutrient recommendations into dietary practices. The nutritional quality of the ensuing recipes,

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menus, and diets is dependent on the quality of nutrient composition data. Consequently, the lack of composition data for important nutrients eliminates the consideration of the latter in the resulting food plans and increases the risk of inadequacy.

3. Nutrient data for epidemiologic correlations: Although even statistically significant correlations do not provide information of cause-effect relationships, epidemiologic studies correlating the risk for certain diseases with nutrient intake patterns have provided most valuable stimuli for animal experimentation and human intervention studies. The recent interest in nutrition as an important modifier of cancer risk was largely stimulated by epidemiologic studies (5). For a proper evaluation of such studies a translation of food consumption patterns into nutrient intakes is necessary and the quality of the resulting correlations depends on quality and completeness of the nutrient data base. Table 2 lists some of the nutrients that are implicated as influencing cancer risk by epidemiologic and laboratory studies. The weight of epidemiologic correlations increases with the number of nutrients for which adequate composition data are available.

4. Nutrient composition data as a basis for agricultural production research: Nutrient composition data of agricultural commodities for human consumption can serve as standards against which new varieties of food crops, animal breeds and food analogues can be measured. Although total yields, sensory properties and harvesting and post-harvest behavior of crops were the main determinants in the search for new practices in the past, these criteria have been complemented by criteria for nutritional adequacy of the products as determined by their nutrient content. The nutritional equivalency principle of new food analogues, for example of soy-based meat replacers, depends on valid and complete nutrient composition data. In addition, the identification of problem nutrients in a national food supply can serve to define future goals for selective breeding or genetic engineering. For example, the adequacy of soy protein for children is limited by the low sulfur amino acid content of the existing soy bean varieties. Most cereal grains are potentially good sources of the essential trace element zinc, but their nutritional adequacy is compromised by a high phytate content that depresses zinc's bioavailability. Consideration of such problems of nutrient composition in important crops can result in a higher nutritional quality of future products and in noticeable improvement of the nutritional health status of whole populations.

5. Nutrient data as a basis for nutritional labeling of foods: Nutritional labeling of foods, gaining an increasing importance in the United States, depends on accurate nutrient composition data. The regulatory, economic and scientific aspects of nutritional labeling are complex and cannot be discussed here.

Before discussing future directions of nutrient composition work it must be emphasized that the Agriculture Handbook No. 8 and its successor publications are one of the two cornerstones of human nutrition activities. The Nutrient Data Base for which USDA has been responsible over decades remains the standard reference work, continuously being updated and available to all users in print and on computer tapes. The following discussion is not meant to detract from its value, nor to suggest a radical departure from proven principles used in the past. It is offered with the hope that by pointing out various problems arising from the rapidly increasing pace of human nutrition research possible solutions will appear that will immeasurably increase the usefulness of nutrient composition data to the nutrition scientists, the implementors of national nutrition policies and to the general public. The needs of the present and future users of nutrient data can be discussed as follows:

1. Accuracy of data: Nutrient composition data are widely used to design healthful diet patterns recommended for use by the healthy U.S. population. In view of the expectation that the public health impact of such recommendations will continue to increase, faulty or incomplete nutrient composition data could lead to substantial consequences for the health of the public, but also to unnecessary and unwanted changes in the food consumption pattern that may have economic impact. For example, in view of the widely accepted role of cholesterol as a risk factor for cardiovascular disease, nutrient analysis must be careful not to include in that category other sterols that may have neutral or even health-promoting effects. Foods that have a substantial nutritional appeal because of high concentrations of one desirable nutrient may, upon close analysis, be found to contain undesirably high concentrations of others that may present a health risk, as is the case for selenium and mercury in certain fish.

The substantial scientific effort that went into the improvement of analytical methods has increased accuracy and precision of our modern data, suggesting that older results, although not necessarily wrong, should be carefully reevaluated by the most recent procedures. Such a reevaluation, recently performed in USDA, led to a substantial revision of the iron data for important food sources of this element (Table 3) (6).

The validation of the accuracy of results can be considered the greatest problem of nutrient analysis. Although accuracy is an absolute term in an abstract sense, its meaning in most analytical work is relative: To get as close as possible to the truth. Except for the simplest gravimetric methods, most nutrient analytical methods are very complex involving reactions of the nutrient with some chemical or physical parameters that may produce precision of the data but give no absolute proof of accuracy. The reliability of data increases when identical results are obtained by basically different methods, a principle used by the National Bureau of Standards to certify concentrations in standard reference materials. It follows, that the probability of an analytical value to be accurate increases with the number of different methods used to arrive at that value. This probability is defined semiquantitatively as the confidence factor of the data. The latter can be established by analytical experts after careful evaluation of the conditions of the analyses that produced the data. The inclusion of such confidence factors with analytical data is necessary whenever important decisions are based on nutrient composition data. Confidence factors have been introduced into the latest revision of position data for iron by the USDA (6).

Although it is hoped that future nutrient analysis research will be able to establish criteria for the absolute accuracy of results and produce direct means of validation, such methods are not now available to the thousands of producers of nutrient analytical data worldwide. At this time the best, perhaps the only way to control the quality of generated data is the inclusion in the analysis of standard reference materials of a composition as close as possible to that of the substrate to be analyzed. The National Bureau of Standards is the Agency responsible for the provision of such standards. Hundreds of standard reference materials have been made available and certified but few among those are suitable as controls for nutrient analysis in foods. It is not only desirable, but in my view essential, that all present and potential providers of nutrient analytical data in foods, together with the National Bureau of Standards, arrive at a list of priorities for important food standard reference materials and jointly provide the financial means to produce and certify these materials.



Finally, accuracy of the data implies the consideration and expression of variability that is present in all biological matter. Therefore, analysis of a sufficiently large number of samples and their exact description is needed to provide the user with not only the analytical, but also the biological confidence limits. Both data and confidence limits are influenced by conditions, such as site and time of origin, storage, and processing, that must be properly defined.

2. Criteria for nutrients to be analyzed: The planner of nutrient composition work is faced by the demands of the user on one hand and by constraints of methodology and funding on the other. The nutritionist calls for composition data of all essential nutrients and for non-nutrients that interact with the former; the health scientist, especially the epidemiologist is, in addition, interested in a variety of additional non-nutrients in foods for which some health effect is either proven or suspected (5). Thus, the list of food components for which there is a justifiable interest is very large and exceeds by far the capabilities of even the largest organizations. It is therefore necessary to set priorities for nutrient composition work (1). The greatest need is for those nutrients that have a Recommended Dietary Allowance, for which some health related nutritional problems are known or suspected, and for which adequate data are not yet available. This category is followed by one comprising important non-nutrients for which experimental and epidemiological research has clearly shown a strong impact on health, such as dietary fiber, certain carotenoids, etc. The rapid increase during the past decade of nutrients for which Recommended Allowances or ranges of safe and adequate intakes have been established has outpaced the production of nutrient data (Table 4). This is true for certain vitamins, for example folacin, B<sub>6</sub>, E, biotin and pantothenic acid, but also for trace elements of substantial public health impact. Analysis of meaningful dietary fiber fractions is just beginning and the important distinction between preformed vitamin A and its precursors in foods is very difficult to make on hand of existing tables. In part, difficulties of methodology are responsible for this situation; other factors are the long neglect of nutrient composition research and the lack of collaboration between the many organizations producing nutrient composition data. Here again, as was suggested earlier, coordination and collaboration among the many contributors of nutrient data for the setting of priorities and the distribution of labor appears imperative if substantial progress is to be expected.

3. Consideration of consumption patterns. The number of identifiable foods and their consumption patterns are constantly changing in the United States and other developed countries. The number of foods, raw, processed and prepared, overwhelms any analytical effort, unless stringent priorities are set. Furthermore, some foods that were important, three decades ago and were thoroughly analyzed then, have lost their relative importance and have been replaced by more complex pre-processed, prepared, or ready-to-eat meals. In order to be useful to the nutritionist, nutrient composition work has to be directed toward those foods that make the greatest contribution to the nutrient intake in the national food supplies. As the rank of these is constantly changing, priorities must be adjusted correspondingly and continuously. Important among the changing pattern of food intake is the increasing proportion of foods consumed away from home, particularly those served by fast-food restaurants. The dominance of a few major companies and the uniformity of their products offers a great potential to the food analyst to provide data that cover a relatively large proportion of important foods with relatively few, but well designed experiments (7).

4. The problem of bioavailability of nutrients: Human nutrition research during the past two decades has amply demonstrated the importance of the biological availability of several nutrients. Bioavailability defines quantitatively the efficiency of a given level of a nutrient in the diet to meet the nutritional need of the organism.

Bioavailability problems are well known for organic nutrients such as amino acids, carbohydrates, vitamins B<sub>6</sub>, B<sub>12</sub>, niacin, folacin, and vitamin E, but the greatest and least understood problems appear to be associated with the trace elements, for example iron, zinc, copper, chromium, and selenium. The importance of bioavailability cannot be overstated: The utilization of dietary iron can vary by a factor of 10 or more, depending on chemical form and dietary interactions, and the high incidence worldwide of iron deficiency is much more a problem of poor biological availability than it is of absolute iron intakes. A similar situation may prevail for the essential trace element zinc; severe zinc deficiency has been described at intakes that are greatly in excess of zinc requirements but that are nearly totally unavailable. These and many other examples strongly suggest that nutrient composition data for many nutrients must be complemented by quantitative information of their bioavailability, if they are to be useful to the nutritionist.

The determination of bioavailability is very complex and time consuming; it is not surprising, therefore, that with one exception few or no quantitative data are available. The exception is the treatment of dietary iron bioavailability as recommended in the Ninth Edition of the Recommended Dietary Allowances (4). The calculation of "available iron" takes into account the different bioavailabilities of heme and non-heme iron as well as a quantification of the enhancing effects of meat, poultry, and fish and vitamin C on the availability of non-heme iron. Qualitative or semi-quantitative statements can be made about biological availability of zinc under various dietary conditions, but they have not yet been validated by experiments in man. A number of in vitro test methods have given promising results that should be evaluated in human studies. Determination of bioavailability is more difficult and more complex than analysis of nutrient concentrations in food. Therefore, the careful setting of priorities for such efforts and adequate funding are essential if progress is to be made.

Conclusion: In order to be useful to the public the results of human nutrition research, scientifically expressed as nutrient requirements must be translated into recommendations for foods, dietary patterns and menus. Conversely, the important results of National Food Consumption Surveys, in order to be scientifically meaningful, must be translated into intakes of nutrients. The translation rests on an adequate data base of concentration and biological availability of nutrients in foods. The demands on that data base increase as nutritional knowledge of nutrients and their interactions expands. The setting of priorities for nutrient data work on a national level and the validation of data by provision and use of standard reference materials are essential if substantial progress is to be made. Cooperation among all providers of nutrient data, in Government, academic institutions, and industry is essential if these efforts are to be successful.



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TABLE 1. RECOMMENDED VS. ACTUAL INTAKES OF NUTRIENTS

<u>Nutrient</u>	<u>Recommendation</u>	<u>Estimated Intake</u>
Vit. A	1000 RE	Near RDA; recent decline
Vit. C	60 mg	>100 mg
Fe	18 mg females	10-12 mg
	10 mg males	18 mg
Zn	15 mg	12 mg
Cu	2-3 mg	1 mg
Se	50-200 µg	80 µg
Cr	50-200 µg	50 µg
I	150 µg	>200 µg

TABLE 2. NUTRIENTS INFLUENCING CANCER RISK

<u>Nutrient:</u>	<u>Analytical Situation</u>
Fat	Generally good, but not enough data on individual fatty acids.
Vit. A	Tables give one value for Vit. A plus carotene
$\beta$ -carotene	Poor data
Selenium	Incomplete data - Location effect
Vit. E	Poor data
Molybdenum	Very poor data - Location effect

TABLE 3. IRON CONTENT OF FOODS  
(mg/100 g)

Food	NCL Values	Agriculture Handbook #8 (1963 Ed)	McCance & Widdowson (1978)
Beef, raw	2.0 ± 0.5(308)	3.2	2.1
Pork	0.9 ± 0.3(26)	2.7	0.9
Molasses	3.6	6.0	---
Corn Syrup	0.15	4.1	---
Hamburger, cooked	2.80	3.2 - 3.5	---



TABLE 4. RECOMMENDED DIETARY ALLOWANCES

<u>Year</u>	<u>Nutrients in Table<sup>1</sup></u>	<u>Protein</u>	<u>Energy</u>	<u>Remarks</u>
1948	10	70	2400	Menus
1953	10	65	2900	No menus
1958	10	70	3000	No menus
1964	10	70	2600	No menus
1968	17	65	2600	No menus
1974	18	56	2700	No menus
1980	30	56	2300-3100	No menus

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1. Includes Estimated Ranges of Safe and Adequate Intakes

## USDA's NUTRIENT DATA BASES

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The need for reliable food composition data is well recognized. These data are essential for many types of research, public policy development and administration, and practical nutrition applications. In response to this need, the Consumer Nutrition Division at USDA's Human Nutrition Information Service operates the National Nutrient Data Bank (NDB). From this bank, data on the nutrient composition of foods are released in both published and machine-readable forms.

Our standard published nutrient data reference is Agriculture Handbook No. 8, "Composition of Foods...Raw, Processed, Prepared" (1, 2). The corresponding machine-readable data set is the USDA Nutrient Data Base for Standard Reference. Most current nutrition-related projects that utilize nutrient data in this country are using one of these two reference sources, or are using a data base that has been derived primarily from one of them.

### Agriculture Handbook No. 8 Revision

Agriculture Handbook No. 8 is presently being revised, and the updated information is being released in sections according to food groups (1). The food components for which data are included in this current revision of the handbook are listed in table 1, and include proximate components, 9 minerals, 10 vitamins, lipids, and amino acids. For each food item, the data are presented for 100 grams edible portion. For most items, data are also presented for two common units of measure and for 1 pound as purchased. The number of observations from which the values were derived and, where possible, the standard error, are also included as an indication of the degree of confidence that can be placed on the mean values. Sections that have been released to date are: Dairy and egg products; spices and herbs; baby foods; fats and oils; poultry products; soups, sauces, and gravies; sausages and luncheon meats; breakfast cereals; fruits; and pork products. The section on vegetables will go to press this winter.

Because the Handbook 8 revision is being released in segments, the machine-readable version, the USDA Nutrient Data Base for Standard Reference, has been supplemented with data from the previous edition of the handbook (2) for food groups not yet updated. As the revision is completed for a food group, the older values in the data base are replaced with the updated information, and data for newly added food items and nutrients are inserted. Periodically we release an updated data base, identified by release number and date. The current release of the Standard Reference data base is Release No. 3, dated 1983, which includes information that appears in the

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first nine revised sections of Handbook 8. Release 4 will include updates for pork and vegetables, sections 10 and 11, and should be available shortly after the vegetable section is printed.

#### Machine-Readable Data Sets

The most important nutrient data bases prepared by the USDA's Human Nutrition Information Service are listed in table 2. The Nutrient Data Base for Standard Reference is used in the Consumer Nutrition Division to create other, more specialized data bases. For example, we are using the Standard Reference file to update and revise Home and Garden Bulletin 72 (3), which is our food composition publication prepared for consumers. This updated publication and corresponding machine-readable data set will be released during 1984. Information on sodium and cholesterol will be included for the first time and approximately 200 new food items will be added. Meanwhile, a data base corresponding to the latest published edition of this bulletin, Data Set 72-1, is available for those individuals who need a small data base that includes the most commonly consumed food items. The current data base contains data on 17 components for 730 foods.

The last two data bases listed on table 2 were developed for the analysis of data from the USDA Nationwide Food Consumption Survey 1977-78. The Data Base for Individual Intake Surveys contains data on the 100-gram basis for those food items reported as being consumed by respondents in the individual phase of the survey. The Data Base for Household Food Use Surveys contains data for 1 pound as purchased for food items reported in the household phase of the survey. Cooking losses were deducted for vitamins in this last data base. We have been developing computer programs with which we can automatically re-create the Data Base for Individual Intake Surveys after an update to the Standard Reference data base. The items are frequently composites, or recipes, incorporating two or more foods from the Standard Reference file.

The four data bases listed in table 2 are available on magnetic tape from the National Technical Information Service (NTIS) at the current cost of \$140 per tape. Information about tape formats and instructions for ordering the tapes can be obtained by writing the Consumer Nutrition Division, Human Nutrition Information Service, Hyattsville, Maryland 20782. The USDA data bases do not include computer programs.

We try, of course, to provide data for all nutrients in every food item. This is not always possible, as evidenced by blanks in our food composition publications. This imposes a special problem in using a computer with nutrient data because of the inability to deal with missing values. If the computer treats the blank as "zero" we know we may be inserting an error into the calculation. To help solve this problem, imputed values, based on the nutrient content of a similar food or on another form of the same food, have been inserted into our data bases for most of the blank spaces. These imputed values are flagged on the tape to alert the user that the data are not based on analytical values.

## Nutrient Data Bank

The Nutrient Data Bank is the computer-based management system we use to store nutrient data. The system includes programs to edit, correct, query, and average individual nutrient values for any given food item. The data comprising the over-all base from which we derive the nutrient values appearing in our food composition reference materials are compiled from several sources, primarily from the food industry, scientific literature, and university and Government laboratories. Our initial work includes locating and obtaining suitable data, followed by evaluation of the individual data items for reliability.

The evaluation is conducted to verify that foods were adequately described, that samples were selected and handled properly, and that appropriate analytical methodologies were used in the laboratory. To be acceptable, a value also must represent the laboratory analysis of a single sample or sample composite, or it may be an average value of two or more observations if accompanied by the number of samples and standard deviation. This requirement for data acceptance has been established to ensure the statistical validity of the average or representative values that are eventually prepared.

Before data entry, each item is assigned a food code from our hierarchical food classification scheme to reflect the description of the food sampled for laboratory analysis. The assigned food codes provide structure to the data base once the items have been entered into the system--that is, the food codes are sorted by the computer so that all data entries for a specific food item are automatically pulled together. Subgroups of a food item can also be defined, and are done so routinely to aid in the intense analytical process required when data are combined from different sources. Examples of subgroupings usually considered during data analysis, and which must be coded before data are entered, include cultivar or breed, growing location, season, maturity, and length and condition of storage. After this intense analysis has been completed for a food group, e.g., fruits, the individual data items are summarized to obtain mean values for each nutrient for each food within the group. The characterization of the group need not be permanently fixed but can be altered in revision to permit changes in the food item, such as the introduction of an important new cultivar or the deletion of an obsolete food process.

Our goal is to provide complete representative nutrient profiles of the foods in our food supply, taking into account processing treatments and other variables that may affect nutrient content. The entire process from data search through the evaluation, analysis and summarization steps is conducted by nutritionists or chemists who are specialists in food composition and who are trained to use the Nutrient Data Bank as their data management tool.

## Nutrient Data Base

We estimate that we presently have about 700,000 individual nutrient values stored in the bank. The number of observations represented in our over-all data base, broken down by proximate components, vitamins and minerals for 10 of the completed food groups is presented in table 3. Data



for the first two groups were collected and summarized before completion of the computer system, and while those values are not presently a part of our data bank, the two groups are included here for comparison purposes. The other numbers represent values that have been used in a summarized nutrient profile released from the Nutrient Data Bank system. Number of observations for fats and oils are not included because most of the data for items appearing in that food group represent fatty acid components.

We estimate that at least 90 percent of the individual values for baby foods, sausages and luncheon meats, soups, and breakfast cereals were provided to us from food companies. The data sources for fruits and vegetables were primarily a combination of (1) food companies for the canned and frozen forms of the foods, and (2) scientific literature and university laboratories for the fresh products. A large part of the data for poultry products were produced in university laboratories under contract with USDA. Most of the data for pork were analyzed by USDA's Meat Science Research Laboratory and the Nutrient Composition Laboratory, both located in USDA's Agriculture Research Service. Most of the values for spices and herbs were taken from the scientific literature; and data for dairy products were collected from a combination of industry, university, Government, and literature sources.

#### Data Processing

Using the Nutrient Data Bank's summarization programs, data for a food item may be combined using a weighting scheme that reflects the importance of each subgrouping of the item. For example, when developing nutrient values for fresh oranges, data for samples from California and Florida were averaged separately for each State. These averages were then combined using a weighting scheme that reflected each of the two subgroup's proportionate share of the national supply of oranges. Weighting procedures are not used when data for an item are too limited or when there are no logical subgroups in which to subdivide the data. Data for subgroups may or may not be reported separately in the handbook. The decision to report them separately is made if consumers can identify them in the market place, and if the data show enough difference to warrant a separation. In the above example, California and Florida oranges were shown separately, but they were also combined to provide an overall weighted item for fresh oranges that could be used when growing location is unknown to the consumer.

Values released from our data bank that are not themselves averages of actual analytical data are usually calculated in some particular way from the analytical values. Protein, for example, is not analyzed directly but is calculated from the average nitrogen content of each food. Carbohydrate is calculated by difference--that is, by subtracting from 100 the sum of moisture, fat, protein, and ash percentages. Kilocalories are calculated from values for protein, carbohydrate and fat by applying specific factors according to the Atwater system for determining energy (4). Protein, carbohydrate, and energy are calculated automatically for each nutrient profile as a routine part of the NDB system.

Some food items are actually mixtures of foods and their nutrient content is calculated from analytical values for the raw products, adjusted for yield and retention. Methods for calculating values are described in

the introductions of the revised sections and in the appendices of the 1963 publication. Calculated values of these types are not inherently lower in quality than direct analytical data, but their quality is, of course, dependent upon the quality of the analytical values upon which they are based and upon the correctness of the procedures for calculation. Under a current contract with Oregon State we now have the opportunity to test the reliability of calculated values. Using a variety of mixed dishes, we are able to compare predicted values calculated from ingredient information to actual analytical data of the fully prepared dish. Based on limited comparisons so far available from this study, we are greatly encouraged by the good agreement observed for a number of nutrients.

We do not usually report nutrient content of foods by brand name because, in most cases, the variability within one brand is as great as the variability among different brands. Therefore, for those products, values represent the food more accurately when data are averaged across brands rather than within brands. Differences in nutrient content that do exist between brands are usually caused by a particular component in the formulation--these differences are designated in the handbook. For example, margarines are designated by ingredient oils. This type of identification is preferable to brand name identification because companies may change their ingredients without changing the brand name. Exception to this rule of not using brand names is made when foods, such as breakfast cereals, cannot be described generically. The ability to use brand names for breakfast cereals was achieved by obtaining the consent and cooperation of the manufacturers prior to collection of data. Candy bars is another food category for which we are seeking a similar arrangement.

#### Provisional Data

To help meet the demand for up-to-date information, we have been releasing provisional tables of data for specific nutrients or for limited numbers of foods for which revised handbook sections have not yet been completed. A table on the Iron Content of Food (5) may be purchased from the Government Printing Office, but copies from our limited stock will be mailed to those who send written requests so long as our supply lasts. Tables on the nutrient content of beverages, the nutrient content of baked products, the amino acid content of fruits and vegetables, and the retention of nutrients during cooking are available as single printed sheets and are obtainable upon request from our office only. In preparation is a provisional table on the carbohydrate fractions of foods. This will be a compilation of existing data on sugars, starch, and complex polysaccharides. Several provisional tables for different nutrients have been published in the Journal of the American Dietetics Association over the past few years (6-9).

#### International Cooperation

The Nutrient Data Bank is also being used to develop world regional food tables as part of a cooperative program between our agency and the Food and Agriculture Organization of the United Nations. As a result of this cooperation, food composition tables for use in the Near East were published by FAO earlier this year (10). We undertook this cooperative work with FAO in recognition of the critical need for food composition data for areas severely affected by nutrition-related health problems.

With our Nutrient Data Bank, and the combined expertise of our two organizations, this effort has been successful and has required a minimum amount of extra expenditure by either organization.

Another area of international cooperation is through the INFOODS organization which will be discussed by Dr. William Rand this morning. We see the concept of a cooperating network of world regional data bases and the development of common procedures for dealing with data on the composition of foods as an exciting challenge for the future.

#### Current and Future Work

We are concentrating current efforts on completing the revision of Handbook 8. Our data processing work is near completion for nuts and seeds and that food group will probably be the 12th revised handbook section to be released. The section on fish should be following closely. Preliminary data summaries have been run for beverages, legumes, baked products, and candies and sweets, but we are expecting additional data for several foods in each of these groups before we can proceed to the final stage. For most of the food groups for which revision is incomplete, extensive research efforts are underway to fill voids in the existing food composition data. These research projects are being conducted under contracts, grants, and cooperative agreements through our agency, by the Nutrient Composition Laboratory and by the Meat Science Research Laboratory. A major study on beef has been completed by the Meat Science Research Laboratory and the Nutrient Composition Laboratory and we are beginning to work with those data. Studies also have just been completed on lamb and veal.

In closing, I would like to discuss two important developments that will be starting this coming year. The first is a modernization of our Nutrient Data Bank system. We are not changing what the system does, but we are taking advantage of advances made in computer science since our system was originally designed. One of the most important changes is to make the system interactive. This will enable the food composition specialists to have closer contact with their data and will make the operation much more efficient.

The second project will be the creation of a revised data base for food consumption studies. As a part of the National Nutritional Monitoring System, efforts will be made to coordinate the activities of the Nationwide Food Consumption Survey conducted by USDA and the National Health and Nutrition Examination Survey conducted by the Department of Health and Human Services. Plans are to create a single nutrient data base that can be used for both surveys, making the results of the two studies more comparable, and thus increasing their usefulness.

We look forward to the future. Methodologies for nutrient analyses are improving. More foods are being analyzed for their nutrient content than ever before. The computer is being coupled with nutrient data bases to provide better tools for dietary and food consumption research. Obviously the demand for reliable nutrient data bases will increase, and we are preparing to meet this challenge.



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TABLE 1.--NUTRIENTS IN AGRICULTURE HANDBOOK NO. 8 (current edition)

<u>Proximates:</u>	<u>Vitamins:</u>
Moisture	Ascorbic acid
Energy	Thiamin
Protein	Riboflavin
Total lipid	Niacin
Carbohydrate	Vitamin A
Crude fiber	Pantothenic acid
Ash	Vitamin B <sub>6</sub>
Dietary fiber, insoluble*	Vitamin B <sub>12</sub>
	Tocopherol*
<u>Minerals:</u>	<u>Lipids:</u>
Calcium	Cholesterol
Iron	Oleic acid
Magnesium	Linoleic acid
Phosphorus	Total saturated fatty acids
Potassium	Total monounsaturated
Sodium	fatty acids
Copper*	Total polyunsaturated
Manganese*	fatty acids
Zinc	Other fatty acids
	Phytosterols*
<u>Amino acids:</u>	
18 amino acids	

\*Limited data provided.

TABLE 2.--USDA COMPUTERIZED NUTRIENT DATA BASES

USDA Nutrient Data Base for Standard Reference, release 3, 1983\*  
 Data Set 72-1, release 2, 1982  
 USDA Nutrient Data Base for Individual Intake Surveys, release 1, 1980  
 USDA Nutrient Data Base for Household Food Use Surveys, release 1, 1980

\*Release 3 includes information from revised sections 8-1 through 8-9.

TABLE 3.--NUMBER OF OBSERVATIONS

Food group	Proximate components and fiber	Minerals	Vitamins
Dairy and egg products	36,461	17,309	17,491
Spices and herbs	15,974	2,125	626
Baby foods	12,263	10,919	15,441
Poultry products	10,711	14,355	9,223
Soups, sauces, and gravies	3,561	2,520	3,994
Sausages and luncheon meats	4,541	5,090	6,610
Breakfast cereals	18,917	12,247	8,024
Fruits and fruit juices	21,420	38,170	34,547
Pork products	36,802	38,810	7,843
Vegetables and vegetable products	42,209	57,877	49,161

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INFOODS (International Network of Food Data Systems) is an organization whose initial design was completed at an international meeting which examined the status of food composition data around the world. INFOODS now is developing slowly but steadily into a global collaboration among people who are concerned with all aspects of food composition data. Its goal, quite simply, is to promote and facilitate the development and use of food composition data which are complete, accurate, current, and accessible. This paper presents some background on why INFOODS is desirable, indeed necessary, what specific problems are to be addressed, the current work plans, and how it is going about its various tasks.

#### MOTIVATION FOR INFOODS

##### Magnitude and Complexity of Food Composition Data

What people consume is perhaps the basic determinant of their health, happiness, and general well-being. Investigations into the specifics of what is eaten and drunk is, however, a task of enormous magnitude. Each day billions of people consume hundreds of thousands of different foods and food combinations and preparations. Moreover, from day to day, season to season, year to year, these foods change; new foods are continually being developed and recipes are modified. The problem of determining food and nutrient intake is being made increasingly more complex by the increasing mobility of people. As individuals and/or groups of people move to new geographic areas they take their food preferences and recipes with them and try to approximate traditional meals with new ingredients. Later, as their foods follow them, new recipes are tried with their more traditional foods. The mobility of people, thus, contributes to the mobility of foods. The situation of today, with a full range of foods, from major staples to exotic delicacies, being moved around the globe, promises to become more complex. This increasing variety of foods available to the individual makes the task of someone interested in food composition difficult, at best.

Another dimension to this problem is the increasing number of different constituents of foods which are thought to be biologically important. No longer are protein, fat, and carbohydrate and a few vitamins and minerals sufficient for many potential users of food composition data.

##### Users and Uses of Food Composition Data

As the number of foods grow, together with an increased variety available to the individual, there is also an expanding number of people, with a diversity of backgrounds, interested in knowledge of the composition of foods. These users, real and potential, of food composition data range from multinational and international organizations down to the individual consumer.

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### International Users:

At a governmental level, it is important to know what is in the foods that are imported in order to use imports as a means for satisfying nutritional requirements of populations and to protect them from toxicologically active constituents and contaminants.

International agencies dealing with food aid move large quantities of food about the world, often to meet specific nutritional needs. They, too, need to know the constituents of food stuffs that are available around the world, and at the same time, the relevant nutrient situation within each country so that they can match the foods supply and availability to human physiological needs.

Food industries which compete on the international market need to know the components of the local food with which they are competing, and at the same time they need to know the nutrient contents of potential ingredients for their products, ingredients which may come from widely separated parts of the world.

Epidemiologists have long realized that food is one of the most important components of an individual's environment. Studies of global disease patterns must be accompanied by data on global food and nutrient consumption patterns.

### National Users:

National governments regulate what is produced within the country as well as what is imported in order to protect and insure the health of their populations. Their activities include setting of regulations and the monitoring of adherence to those regulations. On the other side they must assess the nutritional status of their people, and one important aspect of this is to determine what is being consumed and how this compares with established requirements. All of these activities require reliable and extensive data on the composition of foods available.

National programs of feeding, such as in schools or in the military, require up-to-date information on the nutrient content of foods so that nutritionally adequate diets can be formulated.

### Local Users:

At a level below the national, there are many activities which involve the preparation and recommendation of healthful diets, in institutions such as hospitals and factories and in special segments of society such as the elderly.

Food industries regulate the quality of their foods by routinely analyzing the components, in conjunction with available food tables. New formulations must adhere to nutritional and safety standards and food tables are used to initially choose preparations to investigate.

Universities that include teaching and research programs in nutrition also require use of reliable and current food tables.

#### Individual Users:

The diet and nutrition clinics which continue to increase in number around the country rely heavily on food tables for individual counseling. These complement the individual physicians dealing with patients who range from metabolically disordered to those over and underweight.

Finally, the most extensive use of food composition data by the individual is, of course, the individual shopper scanning the ingredients list, nutrient contents, and percentages of requirements fulfilled on the labels of packaged foods.

It is important to note that these users not only are very different groups of people, who make very different uses of the data, but also that they have different requirements of the data. The epidemiologist can frequently work with approximate values for a few nutrients while the diet counselor worrying about weight needs fairly precise estimates of the energy and nutrient content of foods. The hospital or restaurant serving special meals needs frequently to know the presence or absence of specific constituents in foods, while the shopper is provided with data on the minimum level of a few selected nutrients found in the labeled product.

Thus, food composition tables can be classified by scope, in terms of items it includes: indications whether international, national, local, or individual, and additionally, by the precision of its entries, whether it provides accurate, approximate, minimum levels, or presence or absence data on the levels of nutrients it includes.

#### Problems in Use of Food Composition Data

As the complexity of the food situation grows, and the number and diversity of users of food composition data increase, so too are the number and complexity of the tools the user is being offered to investigate the food situation increasing. Food tables currently are being generated at an increasingly steady rate, and they are being organized into computer retrievable forms. Currently, users are being offered food data tables (books), food data banks (computer tapes and discs), and food data systems (computer programs to use the banks). Ideally, anyone wishing to know anything related to the composition of foods need only type the question into the nearest computer and have an instantaneous answer. Unfortunately this is not the case at present. There are two major problem areas. The first is that the magnitude of the task of accumulating the data is much too large a task for any one group. What is happening is that almost every country seems to be developing its own tables, and in the US almost every region and special interest group. These tables usually are based on USDA data, with additions. However, there is little coordination of their efforts, and the results often are neither complementary nor even consistent.

The other problem area is that of the computers themselves. While admittedly the future includes computers, the current state of things is such that



computers do not talk well to each other unless careful planning and provisions are made. The present incompatibilities and lack of easy interchange of programs and data between computer systems has led to further diversity of food composition data resources.

These problem areas translate into specific practical problems for the users of food composition data. These can be divided into problems of three sorts and include the following:

#### Problems of Generating and Making Data Available:

The first problem in using food composition data is that often the data needed to answer specific questions simply cannot be found. They may not exist, or the user may not know just where to look. The food may have an unfamiliar name, the units may be indecipherable or the tables themselves may be in an unknown language (computer or otherwise), or they may not be readily accessible.

#### Problems of Interpreting Data:

Given that a table (or tables) can be found with entries that seem appropriate, the next set of problems are those of interpreting the numbers provided. At a basic level, the question is simply, do the numbers represent what the user expects: were they determined by standard procedures on representative foods, or were non-standard methods used, or were they estimated from values of similar foods? Any table should indicate the procedure by which each number was generated, and few do.

The next set of problems are those relating to exactly how a table summarizes in just a few numbers the very real variability of nutrient levels present in essentially identical foods. The variability inherent in foods, due to environmental as well as genetic differences, must be coupled with the variabilities introduced by meal preparation and that due to analytic methodology to give a true picture of what the numbers in food composition tables represent. Here too, the situation is compounded by the fact that tables only infrequently indicate exactly what their data are meant to represent.

#### Problems of Using Data:

Fundamental problems in the use of the numbers found in food composition tables arise from differing bioavailabilities of individual nutrients, since what is present in a food is not necessarily what can be utilized by an individual. This problem is further compounded by the interactions between nutrients, the complexities of which are only now beginning to be explored by nutrition scientists.

Other problems come about with specific uses of food composition data. For example, survey data on food consumption very often turn up new and strange foods which are not in the tables and whose nutrient content must be estimated. It must be born in mind that survey data, itself often of marginal reliability, does not improve when coupled with food composition data of unknown quality. Users must remember that food production data can only be

used to estimate the nutrient resources of a population when corrected for storage losses, an important factor in many tropical countries. Another common use of food composition data is to estimate how well nutrient requirements are met. Here what must be kept in mind is that the variabilities of both requirements and components must be considered in estimating nutritional status.

All in all, the use of food composition data requires careful determination of exactly what is wanted, and the realization that the numbers in food tables are often quite imprecise estimates of what people are really eating. Further, just because a number exists in a table which you feel may be related to your problem does not mean that your problem can be answered.

#### ORGANIZATION OF INFOODS

These problems have not gone unnoticed; people for years have been worrying about them. However, the problems have grown and so have the concerns. Several years ago a group in the United States began to meet to see just what could be done. It was early realized that these were international problems and thus an international meeting was held in Italy earlier this year to assess the status and problems of food composition data, to see what should be done, and what could be done, (International Network of Food Data Systems (INFOODS) meeting held 30 January - 5 February, 1983, Bellagio, Italy.) The meeting was sponsored through the Food, Nutrition and Poverty Subprogramme of the United Nations University, and supported by various United States government agencies, private foundations, and the food industry. Participants included representatives from UNU, FAO, WHO, IUNS, and IUFOST.

#### Goals of INFOODS

A major theme of this meeting was that, while there is a tremendous amount of work to be done in individual countries and regions, it is of critical importance that there be international coordination of these activities. To this end, the meeting recommended that an organization be formed, to be called INFOODS (for International Network of Food Data Systems), to formally promote international participation and cooperation in the acquisition and interchange of data on the nutrient composition of foods, beverages and their ingredients, in forms appropriate to meet the needs of government agencies; nutrition scientists, health and agriculture professionals; policy makers and planners; food producers, processors and retailers; consumers.

The conference agreed that in order to successfully fulfill this mission INFOODS would need to develop four aspects: that of (1) a network (some linkage of data bases); (2) standards and guidelines (relating to data gathering, to data storage and interchange, and to data usage); (3) a secretariat (to handle information collection and dissemination, coordination, and need identification and resource allocation); and (4) an international journal devoted to food composition studies.

#### Tasks of INFOODS

To develop these aspects INFOODS has undertaken a number of tasks. The

first is to establish an international directory of food composition data tables and bases. Since ultimately INFOODS is to be a network of food composition data the logical starting point is to survey existing data bases to determine: (1) the content and format of the data bases themselves, (2) the facilities at which the data bases are kept, (3) the compatibility among the data bases, both in terms of content and of form, from the point of view of linking them, and (4) the completeness of the data bases in terms of foods available to consumers.

This information will form not only the basis of the INFOODS network, but the detailed status of food composition data around the world will provide baseline information necessary for the other activities of INFOODS.

These other activities include five international task forces each concerned with areas in which international coordination is essential. The first is the task force on quality of food composition data. The mandate of this task force is to develop criteria and guidelines for the quality of entries in food composition data bases. These will include (1) sampling, analytical methodologies, laboratory practices, (2) modes of expression of data and conversion factors, (3) calculation and imputation of data from analytical values, and (4) criteria for accepting data from the literature. This task force is currently underway.

A second task force is concerned with nomenclature and classification. Its purpose is to develop criteria for the nomenclature to be used in food data bases; what foods are called and how they are coded. This task force will review existing systems and methods of classification and description of foods and their components and evaluate these methods in terms of their suitability for international exchange of food information. Moreover, it will recommend priorities for establishing a universal, international standardized documentation language, and finally, recommend a nomenclature structure that will be internationally acceptable, flexible, and responsive to modern computer technology for data entry, summarization and/or statistical manipulations and for user-responsive retrievals.

A third task force will concern itself with information systems design. INFOODS is ultimately conceived of as a network, linking users of food composition data with the data themselves. This involves moving information around, and the art of moving information has evolved in the last few decades to become a full-fledged discipline; information processing or information systems design. Thus, a task force is being organized to examine how user needs can be satisfied in the light of technological realities. Specifically, this task force will (1) develop a model system in terms of data flow, data regulation, and information services to be provided, (2) discuss with existing data centers how they might be integrated into a global network and how their current structure and modes of operation would influence the network (to define the interfaces necessary), (3) design an implement action plan, including a prototype system, (4) monitor the various aspects of system development, and (5) evaluate this system once operational.

The fourth task force will examine the content and form of the data tables and bases. This group will work on developing international guidelines for the content and form of an "ideal" data file to include (1) items and components to be included, (2) additional information needed in the data file



(data about the data), and (3) logical formats of data records and files for storing, transferring and distribution of food composition data.

The fifth task force has been charged with exploring and detailing the actual needs for food composition data. It will examine the numbers and types of users; who they are, what their uses are, how frequently they use the data. In addition it will examine what data are most frequently used, requested, or needed, and for what purposes. More generally, this group will explore what unmet needs for food composition data exist, and why these needs are unmet, as well as what sort of a network could best serve the users, both current and potential.

A necessary adjunct to these task forces and, indeed to INFOODS itself, are regional INFOODS liaison committees. These are currently being formed and will assist the INFOODS secretariat in identifying and obtaining food composition data bases and other relevant information from the region, as well as assisting INFOODS in identifying the special problems, needs and resources of the regions and persons in the region for participation in the various INFOODS activities. Moreover, they will provide input into the policy decisions of INFOODS through representation on the Policy Committee and the participation of its members in the various INFOODS activities.

The final activity that INFOODS is currently undertaking is that of investigating the merits of establishing an international journal of food analysis, food composition and food data systems. It is intended that this journal serve as a focus for research and information concerned with the generation, processing and use of food composition data. Thus, it would consider for publication original manuscripts concerned with methods of analysis for nutrient and non-nutrient components of foods, the processing of this information, and its application for various uses. In addition, the journal would publish invited editorial papers, reviews of exceptional merit pertinent to the subject matter, proposed and accepted standards and algorithms, notes and rapid communications, and book reviews.

#### SUMMARY

In summary, INFOODS is to be (1) a network of regional data centers, (2) an organizational/administrative framework for various expert task forces, (3) the generator and repository of special international data bases, (4) the stimulator of national data base programs, (5) a general and specific resource for persons and organizations interested in food composition data on a world-wide basis.

Complete, accurate, and readily available food composition data are vitally important. While there is currently much activity in the field it is for the main part focused on local, short-term problems. INFOODS was created in order to provide a global structure for the entire range of activities involved with food composition data and to facilitate these activities. At present Dr. Vernon Young and I, at MIT, are beginning the activities of INFOODS. We are involved with gathering initial data, organizing regional liaison committees, detailing task force responsibilities and contacting those individuals who are concerned and those who should be concerned, all toward the goal of a viable INFOODS. Much of our current activity, of course, is directed to securing significant and stable funding from government agencies, private foundations,



and the food industry. The United States Department of Agriculture has played, and we believe will continue to play, a major role in INFOODS. The National Cancer Institute of NIH and the Food and Drug Administration are serving as the other lead agencies at present. Furthermore, the worldwide context of our initiative is being facilitated by the cooperation and administrative support of the United Nations University. We are hopeful about these efforts because the current situation is such that all of the INFOODS activities must proceed in a timely fashion or chaos will result.

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## INTRODUCTION

The importance and awareness of nutrition in public health issues has resulted in increased demands for knowledge of the nutrient content of foods. This knowledge is required by scientists conducting research in such areas as nutrition, food science, clinical chemistry and epidemiology. Dieticians and other professionals responsible for formulating diets are requesting detailed information about the nutrient content of foods. Food industry personnel and government officials concerned with nutrient labeling and other nutrition-related programs also have an increased need for detailed nutrient composition data.

Quantification of all of the nutrients important to human health in all of the available foods is an overwhelming, if not impossible, task. A conservative estimate of about one million analyses would be required to quantify a reasonable number of nutrients in a few representative samples of each of the generic food items available in the United States. A substantial base of nutrient composition information currently exists; nonetheless, data on many nutrients in many foods are unavailable. Budgetary and manpower constraints require that priorities be determined for nutrients to be analyzed and for the foods to be selected for nutrient analysis.

The purpose of this paper is to outline methods of establishing priorities for generating nutrient composition data. Such factors as the selection of nutrients and the selection of foods for analysis will be discussed. Progress that has been made in generating nutrient composition data will also be highlighted.

## SELECTION OF NUTRIENTS FOR ANALYSIS

There are several reasons for quantifying nutrients in foods. These include research in plant and animal genetics, modifications in post-harvest technology, research in food science, food product development and nutrient composition analysis, per se. In the case of those research areas primarily concerned with nutrient analysis, there must be a rational approach to the selection of the nutrient(s) to be analyzed. Stewart (1981a) recently outlined such an approach; it is shown schematically in Fig. 1. The square represents the large domain of all nutrients. Within the large domain, there are three smaller domains, represented by circles, that correspond to: 1) nutrients associated with public health problems, 2) nutrients for which data are inadequate, and 3) nutrients for which analytical methods are good.

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The overlap of all three smaller domains, represented by region 1 (Fig. 1), corresponds to those nutrients for which it is appropriate to generate nutrient composition information, i.e., those nutrients related to public health problems for which there are adequate methods but inadequate data. Region 2 in Fig. 1 represents those nutrients of public health concern for which there are inadequate data and inadequate methods. The nutrients contained in this region are those nutrients that should receive high priority research on analytical methodology. The nutrients represented by the other regions have a lower priority for nutrient analysis. A discussion of each domain and region follows.

## Nutrients and Public Health

Standards of intakes for individual nutrients which are intended to protect the population against deficiencies have been developed in many countries. In the U.S., these standards are published as Recommended Dietary Allowances (RDA); the most recent edition appeared in 1980 (Nutrition Research Council, Food and Nutrition Board, 1980). Despite the RDA guidelines, several diseases and disease states may, in part, be caused by an inadequate or excessive intake of a nutrient or nutrients. The contribution of nutrient intake to U.S. public health problems is tabulated in Table 1. The assessment of the contributions is general in nature and intended to reflect the concerns of the nutrition research community for the free-living population. Inclusion of a nutrient in the category "None known" implies that an association between these nutrients and a public health problem has not been raised. It does not imply that the nutrient is not required or that it has no biological function. Inclusion of a nutrient in the category "Suspected" indicates that a respected research nutritionist has voiced concern about a public health problem associated with that nutrient, whereas, inclusion in the "Accepted" category means that many professionals, including physicians and nutritionists, generally accept a relationship between a nutrient and a public health problem. It does not imply that a relationship between the nutrient and a public health problem has been proven.

## Knowledge of Nutrient Composition of Food

The United States Department of Agriculture has collected and disseminated data on the nutrient content of foods for many years. This activity is currently vested in the Nutrient Data Research Branch, Consumer Nutrition Division of the Human Nutrition Information Service. Scientists in this branch have recently re-evaluated the state of knowledge on the nutrient content of foods; the results of their most recent evaluation are shown in Figures 2-9.

Careful examination of Figures 2-9 reveals that a considerable amount of nutrient content data is available for commodities. These data have resulted, in part, from the research effort in such disciplines as plant and animal genetics, food science and technology, post-harvest physiology and agriculture engineering during the past two decades. Analytical information gathered for nutrient labeling has also contributed to these data. During the past few years, a considerable volume of new nutrient content information has become available; see Stewart (1980) for the state of knowledge of nutrient composition in early 1980. This phenomenon can be primarily attributed to the public demand for these data and the response to that demand as a result of the awareness of nutrition in public health problems.



Nonetheless, nutrient composition information is lacking for several food groups and for several categories of nutrients. A dearth of information exists for those food groups consisting primarily of highly processed or manufactured foods, i.e., baked products, snack foods, etc. Changes in the lifestyle of Americans during the past quarter century have resulted in the proliferation of convenience foods (fast foods, frozen dinners, restaurant food, etc.) for which limited nutrient composition data are available. In the case of entire categories of nutrients, biological effects and requirements have only recently been described. For some nutrients, lack of knowledge of their level in foods must be attributed to the lack of accurate, precise and inexpensive analytical methods. The complexity of foods, the multiplicity of the chemical forms of the nutrients, and the sensitivity required for quantitation place special demands upon analytical methodology and the analyst.

#### Analytical Procedures for Nutrient Analysis in Foods

Evaluation of existing methods.-Valid analytical procedures are essential for reliable nutrient analysis of foods. Only trained analysts using accurate and precise analytical techniques can acquire reliable data on the nutrient content of foods. If analytical techniques are inadequate, then even data collected by trained analysts should be questioned and as a result, resources may be wasted. The state of methodology for the analysis of nutrients in foods is tabulated in Table 2. The boundary between acceptable and unacceptable methods lies between substantial and conflicting states of methodology (Stewart 1980, 1981a). Thus, if appropriate methods are used by trained analysts, values will probably be correct for nutritionally significant levels of those nutrients listed as having adequate and substantial methodologies. In the case of most of the other nutrients, it is doubtful that valid results can be obtained during routine analysis. For these nutrients, different methods generally yield different values. Nonetheless, for a few of the nutrients in the conflicting and lacking category, reliable values may be obtained if extreme care is exercised by the analyst. There are also some very promising new methods in these categories and hopefully they will be quickly validated and adopted.

Accuracy and precision of the resulting data were used to classify the state of methods for nutrient analysis of food (Table 2). As suggested by Stewart (1981a), the analytical value should be within 10% of the true value when the nutrient of interest is present at nutritionally significant levels (greater than 5% of the RDA per standard serving or daily intake, whichever is greater). Many methods fail this criterion. The usual causes of failure are the presence of interfering compounds or the loss or destruction of the nutrient during extraction and sample preparation. Sometimes samples are contaminated from external sources and the resulting nutrient level is apparently higher than the true level. Some methods lack specificity, a particular problem when accurate analytical data are required for closely related molecular structures. Lastly, some methods lack the sensitivity to accurately measure nutritionally significant levels of a nutrient.

Precision is also an important consideration in the evaluation of a method. Common sense must be applied during the evaluation of analytical precision in nutrient analysis. The method must be sufficiently precise to yield credible nutrient composition information and at the same time some imprecision must be tolerated in the interest of time and economics. With pure standards, the maximum acceptable relative standard deviation (RSD)



should range between 10 to 15%; attempts to obtain RSD's of 1% or less are probably impractical uses of resources. In the case of nutrient analysis in foods, acceptable precision should be tempered by the level of the nutrient relative to its nutritional significance. Stewart (1981a) has recently shown that RSD's in the range of 10-15% are adequate for all nutrients except for those that occur at low levels (5-30% RDA per serving) relative to their nutritional significance. In these cases precision criteria should be relaxed by some predetermined standard.

Analysis of identical samples by several laboratories often show unacceptably large variations among laboratories when different methods are used or even when the same method is used. Interlaboratory quality control of nutrient analysis must be improved because most nutrient composition tables and data bases are compiled from data generated by many laboratories. The appropriate use of quality control samples and the development and use of nutrient standards and standard reference materials will greatly improve the quality of nutrient composition data.

Modifications required to improve existing nutrient analysis methods are tabulated in Table 2 (footnote b). Changes to move a method from the substantial to adequate category may require only minor modifications of the extraction and quantification steps and/or application of the method to more food groups by the research community. Changes, however, required to recategorize an unacceptable method (conflicting or lacking) as acceptable (adequate or substantial) may require extensive method modification or development, development of extraction and sample preparation procedures and application of the new method to several different food groups.

Development of analytical procedures.-Substantial advancements in analytical instrumentation have been introduced during the past decade. The application of analytical instrumentation, however, constitutes only part of a total analytical procedure. Stewart (1980) has outlined the components of an ideal analytical method for the analysis of nutrients in foods. These components consist of homogenization and subsampling, extraction, separation, detection and identification, calculation of results and report generation, application of standards, standard reference materials and control samples, and finally validation of results. The development of a reliable analytical procedure is complex but relatively straight forward if the problem is approached in a systematic manner.

Scientists at the Nutrient Composition Laboratory (Agricultural Research Service, USDA), located at Beltsville, have been actively working on the development of new and improved techniques for the analysis of nutrients in foods for a number of years. They have taken a systematic approach to methods development by evaluating each component of the ideal analytical method, as detailed by Stewart (1980). A partial listing of the results of this effort is tabulated in Table 3. A considerable effort has been expended on developing techniques that not only quantify the total amount of a nutrient but also separate and quantify the various forms of a nutrient in a food. For example, methods have been developed to determine the level of the various forms of vitamin B-6 in foods (Vanderslice et al., 1983). Data generated from such procedures can be used to calculate the total amount of a nutrient in a food. More importantly, these detailed procedures will allow the assessment of bioavailability for specific nutrients or vitamins from food sources and will permit nutritionists and medical scientists to investigate the influence

of various forms of a vitamin on the health of human beings. A number of other procedures have been developed to similar states of sophistication, e.g., Li et al., 1982, Slover et al., 1983 (Table 3).

During the routine analysis of samples with any analytical technique, adequate standards and control samples must also be analyzed to provide a basis for the validation of the results from unknown samples (Stewart, 1980). Only after careful validation of results can data be published and collated with other data in data bases. Scientists at the Nutrient Composition Laboratory in collaboration with investigators at the Consumer Nutrition Division (Human Nutrition Information Service) have developed a code system to provide information about the quality of data in food tables and provisional nutrient tables. The system has been recently described and applied to data on the iron content of food (Exler, 1983); an example of the application of the system is shown in Table 4. Briefly, the confidence codes of the data give the user of the data an indication of the confidence he can have in the mean value given in the table. The codes are based on a critical evaluation of the data sets from which the mean values were derived as outlined by Exler (1983). The application of confidence codes to nutrient data provides the users of these data, for the first time, an estimate of the reliability they can place in the data. The code system, as proposed, is not intended to be a "final" system, rather an initial system that can be altered and modified to provide the desired information to the users.

Procedures for the analysis of nutrients in foods are also often developed by scientists associated with other government laboratories, industrial laboratories or academic institutions. These procedures, like the procedures developed by scientists at the Nutrient Composition Laboratory, are published in journals of scientific organizations. Periodically, the state of new procedures are reviewed and published as an article in a journal, e.g., Gregory, 1983, or as a book, e.g., Charalambous, 1984. All of the above forms of documentation aid greatly in the transfer of new technology from the laboratory where it is developed to laboratories where it can be applied to a multitude of samples.

Development of methods for the accumulation of valid data on nutrients in foods continues to be a major research effort of the scientists at the Nutrient Composition Laboratory. A partial listing of methods that are currently undergoing development appears in Table 3. Current analytical methods for several of the nutrients listed in Table 3, i.e. carotenes, heme/non-heme iron, are primitive, non-existent, or non-specific, and as a result, a dearth of data exists. However, the importance of some of these nutrients to human health, i.e. carotenes, fiber, inorganics, has recently been emphasized by a report from a committee of the National Research Council (1982). Mathematically sound procedures for sampling the food supply of the United States are also being developed at the Nutrient Composition Laboratory. Application of these procedures will allow scientists to accurately estimate the variability in the nutrient content of foods across this country. Other important areas for which methods are being developed include validation of analytical data, automated sample extraction, and laboratory data management.

Development of instrumentation.-Development of new or improve analytical procedures for nutrient analysis of foods generally takes advantage of existing analytical instrumentation. During the past decade however, certain

characteristics of the analysis of nutrients in foods, i.e., complex matrices, large numbers of nutrients of interest in a large number of samples and economics, have provided the impetus for the development of new analytical instrumentation. Two examples are the development of the concepts and equipment for 1) flow injection analysis, and 2) simultaneous multielement atomic absorption spectrometry.

Flow injection analysis (FIA), recently reviewed by Stewart (1981b, 1983), was developed simultaneously by a group of scientists in Denmark and by an independent group in the United States located at Nutrient Composition Laboratory. The U.S. group developed FIA to analyze a large number of samples during a relatively short period of time with high precision and accuracy. As the theoretical basis of FIA is evaluated and established (Vanderslice et al., 1981b), the applications of this new instrumentation appear to be very broad.

Simultaneous multielement atomic absorption spectrometry (SIMAAC), invented as a result of the cooperative efforts of scientists at the Nutrient Composition Laboratory and the University of Maryland, and recently reviewed by Harnly (1983) and Wolf and Harnly (1983), represents a combination of the advantages of atomic absorption spectrometry (AAS) and inductively coupled plasma, atomic emission spectrometry (ICP-AES) for the quantification of inorganic nutrients (minerals). The SIMAAC currently operating in the Nutrient Composition Laboratory is capable of quantifying sixteen elements simultaneously from either flame or furnace atomization, has extended analytical range capabilities, and is insensitive to interferences because background correction is determined for each element analyzed. Current research with SIMAAC is oriented toward development of furnace atomization as a more reliable atomization source and the development of a microprocessor controlled instrument.

#### SELECTION OF FOODS FOR NUTRIENT ANALYSIS

The summaries of the present state of knowledge of nutrient composition presented in Figures 2-9 show that a considerable amount of information on the nutrient content of many foods is inadequate or lacking. Nonetheless, in order to make advances in human nutrition, nutrient composition information for many food items must be generated as rapidly as possible, consistent with acceptable techniques of sampling and analysis. The numbers of foods available for sampling and analysis could overwhelm analytical resources unless nutrient composition studies are carefully planned.

An approach to the selection of foods for nutrient analysis, suggested by Stewart (1981a), is shown in Fig. 10. The square represents the large domain of all foods. Within the large domain, there are four smaller domains, represented by circles that correspond to: 1) core foods, 2) categories of foods which lack data (inadequate data), 3) foods having high concentrations of nutrient(s), and 4) foods as eaten. The overlap of the four smaller domains, represented by region 1 (Fig. 11), correspond to those foods for which it is appropriate to generate nutrient composition data immediately. Foods represented by the other regions have a lower priority for nutrient analysis, but it is hoped that all nutrients in all foods would ultimately be quantified.



Recent studies have demonstrated that a small percentage of the total food items available in the U.S. make up a large percentage of the total food consumed. About 15% of the available food items account for 90% of the weight of the diet consumed (Pennington, 1983) whereas about 4% of the total food items account for 90% of the reported frequency of consumption (Wolf, 1981). These foods with high consumption have been termed "core foods" (Stewart 1981a). The data in Table 5 compare the 15 highest ranking food items based on frequency of consumption and weight of consumption. There is remarkable similarity in the food items that appear in these two lists. Core food lists identified with specific socio-economic or cultural groups may vary somewhat from these lists. Nonetheless, a great deal of information on nutrient intake can be provided by using the nutrient composition of core foods.

The extent of the knowledge of the nutrient composition of food is presented in Figs. 2-9 and has been discussed earlier in this paper. Analysis of foods containing high concentrations of a nutrient(s) can be justified because foods that fall in this category as well as in the categories of foods as eaten and of core foods supply the majority of a nutrient in the diet. The analysis of low levels of nutrients in a food (<5% RDA per serving) may require extensive modification of analytical procedures in order to obtain adequate analytical accuracy and precision. In this case, a decision must be made in regards to the value of the analytical data relative to the cost of obtaining it.

Analysis of nutrients in "foods as eaten" provides the most accurate data on the nutrient composition of foods as consumed by human beings. These data will permit the total variability of the nutrient content of foods, influenced by such parameters as cultivar or breed, season, processing procedure, cooking method, etc., to be estimated. The use of limited distribution centers by many U.S. food suppliers, the widespread consumption of processed foods and the rigorous quality control systems used by the food industry have reduced the variability of the nutrient content in many foods. Several laboratories are currently collecting data and will soon be able to estimate the variability of the nutrient content in selected foods from nationwide samplings.

Scientists at the Nutrient Composition Laboratory have conducted a number of food sampling/nutrient analysis studies. Studies that have been completed, studies in progress and studies planned for the near future are tabulated in Table 6. In addition to the food item sampled, the nutrients that were analyzed or are planned for analysis, and the distribution of the nutrient data are also indicated (Table 6). It should be noted that all nutrient data generated from food sampling studies are made available to the Consumer Nutrition Division, the Nutrient Coding Center (National Institutes of Health, Minneapolis) and several other government agencies and laboratories for inclusion in their nutrient data bases.

Many of the programs currently ongoing at the Nutrient Composition Laboratory are cooperative efforts with other government agencies and state universities. For example, the Heart, Lung and Blood Institute (NIH, HHS) and more recently, the National Cancer Institute (NIH, HHS) support several of the programs related to the development of new and improved techniques for the analysis of nutrients in foods. Several food sampling/nutrient analysis studies have involved the cooperative efforts of scientists at the



Meat Science Research Laboratory (Agricultural Research Service, USDA), Consumer Nutrition Division and several state universities (pork, beef, and chicken). Results from these cooperative efforts have contributed greatly to the nutrient data that have become available in recent years.

Many federal, state and industrial organizations support studies that result in data on the nutrient content of foods. The Consumer Research Division currently has several active contracts that will generate considerable nutrient data. Heart, Blood and Lung Institute, National Cancer Institute, and Food and Drug Administration, through the Market Basket Survey, all have active research programs that will also result in nutrient data. Substantial amounts of nutrient data are generated by food processors and the food industry. Finally, data from many research programs at state and private universities are also integrated into nutrient data bases. Continued substantial support by a number of federal, state and industrial organizations will be required to provide complete and accurate data bases on the nutrient content of foods.

#### SUMMARY

Generating nutrient data is a complex process requiring decisions at several steps. Nutrients selected for analysis should be associated with public health problems, lack adequate analytical data, and have accurate and precise analytical methods available. In the case of some nutrients, accurate and precise analytical procedures need to be developed before analysis of nutrients in foods can proceed. The analysis of nutrients in those foods for which data are sparse should concentrate on frequently consumed foods which have been prepared by customary procedures; those foods which contribute large amounts of nutrients should be the first priority. Compilation of accurate and precise nutrient data bases will permit health professionals to accurately assess nutrient intake and utilization and to improve human health through nutrition education and/or therapy.

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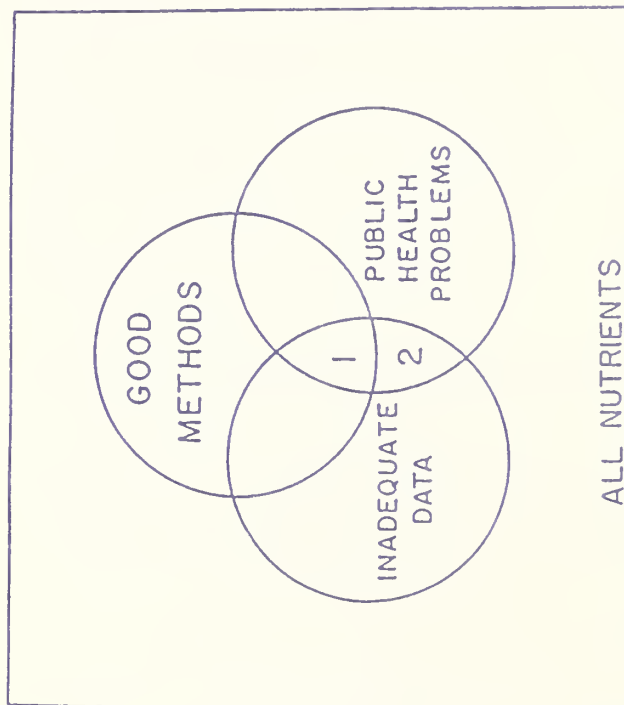


Figure 1. Schematic representation of factors used in the selection of nutrients for analysis. The square represents the domain of all nutrients. Each circle represents a smaller domain of nutrients associated with a specific factor. Region 1 represents those nutrients for which it is appropriate to generate composition data. Those nutrients represented by region 2 should receive high priority research on analytical methodology. Adapted from Stewart 1981a.

# STATE OF KNOWLEDGE OF NUTRIENT COMPOSITION

CARBOHYDRATES			
INSTANTIAL NUTRIENT	STARCH	MULTIPLE SUGARS	
DAIRY FOODS			
BAKED PRODUCTS, BAKED			
SWEET GOODS			
COFFEES, CACAOES			
BEVERAGES			
MEAT/FAST CEREALS			
CANDIES			
CEREAL GRAINS, WHOLE			
FLOUR			
PASTA			
DAIRY PRODUCTS			
EGGS & EGG PRODUCTS			
FAST FOODS			
FATS AND OILS			
FISH & SHELLFISH, RAW			
COFFEES			
PROCESSED MEATS			
FRUITS, RAW			
COFFEES			
PROCESSED MEATS			
INFANT FORMULA			
INSTITUTIONAL FOOD			
LEGUMES, RAW			
COFFEES			
PROCESSES			
MEAT, RAW			
LAMB			
PORK			
SAUSAGE			
VEAL			
RISED BREADS, COMMERCIAL			
HOME PREPARED			
NUTS & SEEDS			
POLYESTER			
RESTAURANT FOOD			
BAKED FOODS			
SOUPS			
VEGETABLES, RAW			
COFFEES			
PROCESSES			
CANDIES			

Figure 2. State of knowledge of the carbohydrate composition of foods.

# STATE OF KNOWLEDGE OF NUTRIENT COMPOSITION

LIPIDS			
INSTANTIAL NUTRIENT	CHOLESTEROL	OTHER LIPIDS	TRANS FATTY ACIDS
DAIRY FOODS			
BAKED PRODUCTS, BAKED			
SWEET GOODS			
COFFEES, CACAOES			
BEVERAGES			
MEAT/FAST CEREALS			
CANDIES			
CEREAL GRAINS, WHOLE			
FLOUR			
PASTA			
DAIRY PRODUCTS			
EGGS & EGG PRODUCTS			
FAST FOODS			
FATS AND OILS			
FISH & SHELLFISH, RAW			
COFFEES			
PROCESSED MEATS			
FRUITS, RAW			
COFFEES			
PROCESSED MEATS			
INFANT FORMULA			
INSTITUTIONAL FOOD			
LEGUMES, RAW			
COFFEES			
PROCESSES			
MEAT, RAW			
LAMB			
PORK			
SAUSAGE			
VEAL			
RISED BREADS, COMMERCIAL			
HOME PREPARED			
NUTS & SEEDS			
POLYESTER			
RESTAURANT FOOD			
BAKED FOODS			
SOUPS			
VEGETABLES, RAW			
COFFEES			
PROCESSES			
CANDIES			

Figure 3. State of knowledge of the lipid composition of foods.







Table 1. CONTRIBUTION OF INADEQUATE OR EXCESSIVE NUTRIENT INTAKES TO PUBLIC HEALTH PROBLEMS IN THE U.S.<sup>a</sup>

Nutrient Category	Contribution to U.S. Public Health Problems		
	None known	Suspected	Accepted
Carbohydrates, fiber and sugars	Starch Maltose	Fructose	Lactose Fiber Sucrose
Energy			Food energy
Lipids	---	Fatty acids Other sterols	Cholesterol Total fat
Minerals/Inorganic Nutrients	Cobalt Nickel Vanadium Tin	Arsenic Chromium Copper Iron Magnesium Manganese Molybdenum Selenium Silicon	Calcium Fluorine Iodine Iron Phosphorus Sodium Zinc
Proteins and amino acids	---	Amino acids <sup>b</sup> Total protein	---
Vitamins	Biotin Choline Pantothenic acid	Carotenes Niacin Vitamin E Vitamin K	Folic acid Riboflavin Thiamin Vitamin A Vitamin B <sub>6</sub> Vitamin B <sub>12</sub> Vitamin D

<sup>a</sup> Adapted from Stewart (1981).

<sup>b</sup> It is unlikely that increased information on the nutrient composition of foods for these nutrients will significantly help in combating the public health problems associated with these nutrients.

Table 2. STATE OF DEVELOPMENT OF METHODS FOR ANALYSIS OF NUTRIENTS IN FOODS<sup>a</sup>

Nutrient Category	State of methodology <sup>b</sup>		
	Adequate	Substantial	Conflicting
Carbohydrates, fiber and sugars		Individual sugars	Fiber Starch
Energy			Food energy
Lipids		Cholesterol Fat (total) Fatty acids (common)	Sterols Fatty acids (isomeric)
Minerals/Inorganic nutrients	Calcium Copper Magnesium Phosphorus Potassium Sodium Zinc	Iron (total) Selenium	Arsenic Chromium Fluorine Iodine Manganese
Proteins and amino acids	Nitrogen (total)	Amino acids (most)	Amino acids (some) Protein (total)
Vitamins		Niacin Riboflavin Thiamin Vitamin B-6	Vitamin A Carotenes Vitamin B-12 Vitamin C Vitamin D Vitamin E Folic acid Pantothenic acid
			Biotin Choline Vitamin K

<sup>a</sup> Adapted from Stewart (1981).

<sup>b</sup> Description of methodology states

Factors	Adequate	Substantial	Conflicting	Lacking
Accuracy	Excellent	Good	Fair	Poor
Speed of analysis	Fast	Moderate	Slow	Slow
Cost per analysis	Modest (<\$100)	Modest to high	High	?
Development needs	---	Method modif.	Method develop. modif.	Method develop. modif.
		Extraction proc.	Extraction proc.	Extraction proc.
		Applications	Applications	Applications

Table 3. ANALYTICAL TECHNIQUES DEVELOPED OR UNDERGOING DEVELOPMENT  
AT THE NUTRIENT COMPOSITION LABORATORY

<u>Techniques Developed</u>	
Fatty acids	Lanza et al., 1980
Fiber	Baker et al., 1979, 1983
Inorganics	Wolf 1979, 1982
Sugars	Li et al., 1982
Vitamin B-6	Vanderslice et al., 1983
Vitamin E and sterols	Slover et al., 1983

Techniques Undergoing Development

Carotenes	
Fiber and fiber fractions	
Heme/non-heme iron	
Inorganics	
Lipids and lipid components	
Starch	
Thiamin	
Vitamin C	
Automated sample extraction	
Computerized laboratory data management	
Nationwide sampling of foods	
Reference materials/quality control samples	

Table 4. APPLICATION OF CONFIDENCE CODES TO NUTRIENT DATA  
IRON CONTENT OF EDIBLE PORTION OF FOOD

Item No.	Food	Amount of iron in 100 grams		Confidence code <sup>1</sup>	All-8 Item No. (1963)
		Mean	Standard error	Number of samples	
Bakery products					
Breads:					
1	Cracked wheat.....	2.6	0.42	4	444
2	French, enriched.....	2.8	.12	38	446
3	Mixed grain.....	3.2	.09	136	---
4	Raisin.....	2.9	.29	11	452
Rye:					
5	Pumpernickel.....	2.9	.19	4	456
6	Regular.....	2.7	.10	43	454
7	Wheat.....	3.5	.05	140	---
8	White, enriched.....	3.0	.02	445	461
9	Whole wheat.....	3.2	.15	27	471
10	Danish pastry.....	1.8	.10	9	1899
11	English muffins, plain.....	2.8	.09	25	---
Rolls:					
12	Dinner, enriched.....	3.1	.07	110	1902
13	Frankfurter or hamburger, enriched.....	3.0	.03	250	1902
14	Rye.....	2.8	( )	2	---
15	Tortillas, corn.....	1.9	.06	6	---
Beef					
16	Hamburger, lean, cooked.....	2.7	.16	4	368
17	Lean meat, cooked.....	2.7	.08	79	---
18	Liver, fried.....	5.7	1.2	5	1267

<sup>1</sup> Description of confidence codes; adapted from Exler, 1983.

Confidence Code	Meaning of confidence code
a	The user can have confidence in the mean value.
b	The user can have some confidence in the mean value; however, some questions have been raised about the value or the way it was obtained.
c	There have been some serious questions raised about this value. It should be considered only as a best estimate of the level of this nutrient in this food.
No asterisk	Data from two or more sources; mean of each source varies less than 30% from overall mean.
*	Data from a single source.
**	Data from two or more sources; mean of each source varies more than 30% from overall mean.



Table 3. COMPARISON OF CORE FOOD LISTS BASED ON  
FREQUENCY AND WEIGHT OF CONSUMPTION

Rank	Food item based on frequency of consumption <sup>a</sup>	Food item based on weight of consumption <sup>b</sup>
1	Water	Water
2	Bread, white	Coffee
3	Milk, cov, whole	Milk, cov, whole
4	Coffee	Soda, carbonated, cola type
5	Orange juice, frozen, reconstituted	Tea
6	Tomatoes, fresh	Beer
7	Lettuce, raw	Milk, cov, 2% fat
8	Margarine	Soda, carbonated, lemon-lime type
9	Sugar, beet and cane	Orange juice, frozen, reconstituted
10	Soda, carbonated, fruit flavored	Bread, white
11	Butter	Soft drinks, from powder
12	Tea	Beef, ground, regular
13	Milk, cov, skim	Beef, steak, loin/sirloin
14	Soda, carbonated, cola type	French fries, frozen, heated
15	Jellies	Lettuce, raw

<sup>a</sup> Adapted from Wolf (1981); frequency of consumption based on a 14-day dietary record maintained by 22 subjects aged 14 to 64.

<sup>b</sup> Adapted from Pennington (1983); weight of consumption calculated as average grams per day for both male and female of the 14-16, 25-30 and 60-65 year age groups.

Table 6. FOOD SAMPLING NUTRIENT ANALYSIS STUDIES:

NUTRIENT COMPOSITION LABORATORY

Food or Food Group	Nutrient(s)	Distribution of Results
<u>Completed studies</u>		
Cereals	Fiber Inorganics Sugars Vitamin B-6	Baker and Holden, 1981 Nutrient data bases Li and Schuhmann, 1980, 1981 Vanderslice et al., 1981a
Fruit and Vegetable juices	Inorganics Sugars	Nutrient data bases Li and Schuhmann, 1982
Yogurts	Inorganics Sugars	Nutrient data bases Li et al., 1983
Fast foods	Lipids	Slover et al., 1980
Bacon	Inorganics	Nutrient data bases
Cured pork	Inorganics	Nutrient data bases
Core foods (limited)	Inorganics	Nutrient data bases
<u>Studies in progress</u>		
Pork	Several	
Beef	Several	
Ground beef	Several	
Chicken (supermarket)	Inorganics Vitamin B-6	
Tuna	Inorganics Vitamin B-6	
Salty snack foods	Several	
<u>Planned studies</u>		
Chicken (Fast food)	Several	
Ground beef	Se	
White bread	Se	

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Farm sector debt increased at an average annual rate of nearly 8 percent between 1950-1970. In the seventies the increase averaged about 12 percent. These increases were more than twice the inflation rate for those periods. Few economic variables--farm or nonfarm--have sustained such a long and high growth rate. Providing this volume of credit to the farm sector has been a major challenge to lenders.

This challenge required actors on the farm credit stage to cast a much larger net for funds in order to accommodate their borrowers' needs. To attract funds banks developed a bewildering array of deposit products--NOW accounts, Super NOW's, money market funds, certificates, IRA's, etc. The decade saw banks obtain enhanced access to FICB's, seasonal borrowing privileges at the Fed, expanded participations with banks as well as PCA's, not to mention regional compacts which obtain funds from larger banks (one of which is a foreign bank) and channel them to smaller member banks. The Cooperative Farm Credit System now issues consolidated systemwide bonds and notes, maintains line of credit with banks and other institutions and sells their securities to a wide variety of investors in the U.S. and abroad. The Federal Financing Bank has made funding for the FmHA more certain, efficient and flexible. Life insurance companies have evolved a variety of products which permit them to obtain more funds.

This is an incomplete list of the methods used by farm lenders to obtain adequate, low cost funds. It is sufficient, however, to indicate that the major actors financing family farms have remained the same, but the arrangements they employ to garner loan funds for the sector has probably changed more in the last decade than in any time since the 1930's. Further deregulation of banks, evolving nonbank financial institutions and discussions about removing the "agency status" from the Cooperative Farm Credit System indicate that the institutional structure serving the farm sector will continue to change but perhaps not as rapidly as in the past decade.

The large appetite of the farm sector for loans successfully challenged lenders to develop new and more efficient sources of funds for their farm customers. In the current decade the challenge may shift to developing more effective loan delivery systems for financing the family farm. This challenge arises out of the present financial condition and structure of the sector. Therefore, I plan to assess current credit conditions in the farm sector, prospects for the demand for credit in early 1984 and the ability of lenders to provide credit to the farm sector during the first half of 1984. I will close by examining changes in the structure of the farm sector for implications this has to the ways farm credit and related financial services are delivered to family farms in the future.

## CREDIT CONDITIONS

Sizing up farm credit conditions across the county--never an easy task--is especially difficult this year. Widespread drought on top of the massive PIK program sharply reduced farm output and boosted crop prices. Nevertheless, the combination of higher prices, increased government payments and lower production expenses is expected to result in a significant increase in 1983 net farm income from the year ago level.

A sample of agricultural bankers is surveyed annually by the American Bankers Association in order to obtain bankers' assessments about farm credit conditions. This year's results will be released in about one week. That report will provide an indication of credit conditions in mid-summer, but the toll extracted by drought following the completion of the survey will not be measured. Nevertheless, information and relationships from past surveys are useful in sizing up credit conditions at this time.

In the past there has been a good association between the direction of change in the farm sector's net income and a variety of measures of the condition of the farm loan portfolio at ag banks. For example, weakness in net farm income in 1981-82 sent measures of loan renewals, refinancings, delinquencies and losses to new highs, figures 1 and 2. At the same time, loan repayment rates and ag bankers views of the overall quality of their farm loan portfolio declined to new lows, figure 3.

Farm credit surveys conducted by some Federal Reserve Banks<sup>1</sup> in mid-1983 showed improvement in some of these selected measures of credit conditions from their poor 1982 level. The broader sample of ag banks included in ABA's annual survey is also expected to report some improvement. What is difficult to measure is whether the effects of continued drought after mid-summer dashed this improvement. My judgment is that even with the drought, measures of farm credit conditions would still show some improvement over their dismal levels of mid and late 1982. Factors supporting this view include USDA's projection that 1983 net farm income will significantly surpass 1982's and the equity of the sector should improve for the first time in two years. This gain is likely to occur as farmland values rise in many areas and farm debt shows little or no growth.

## DEMAND FOR FARM CREDIT

In the year ending June 30, 1983, the percentage increase (5-6 percent) in total farm debt was among the smallest in twenty-five years.

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<sup>1</sup> See Financial Letter, Vol. 9, No. 8, August 1983, Federal Reserve Bank of Kansas City and Agricultural Letter, No. 1610, August 19, 1983, Federal Reserve Bank of Chicago.

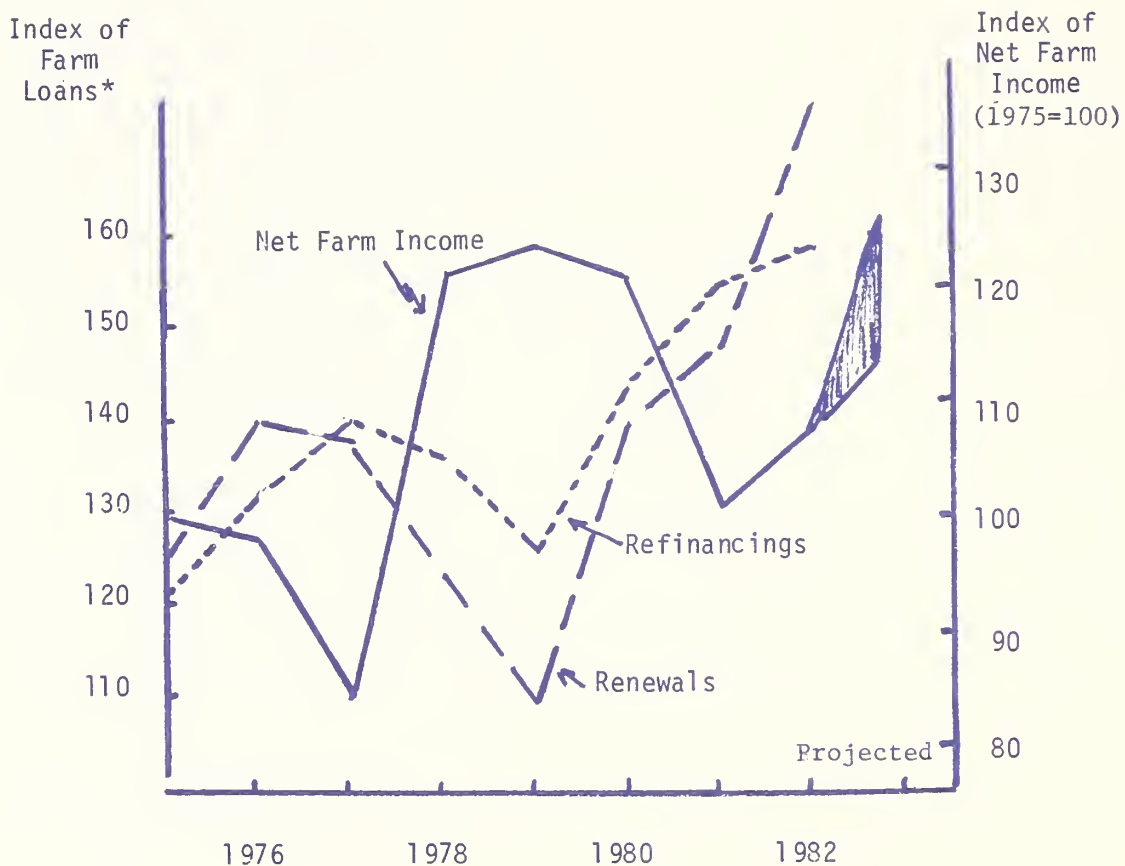


Figure 1. Index of Net Farm Income and Indices of Farm Loan Renewals and Refinancings at Ag-Banks, Mid-year.

\*Indices constructed by subtracting the percentage of banks reporting decreases from those reporting increases and adding 100.



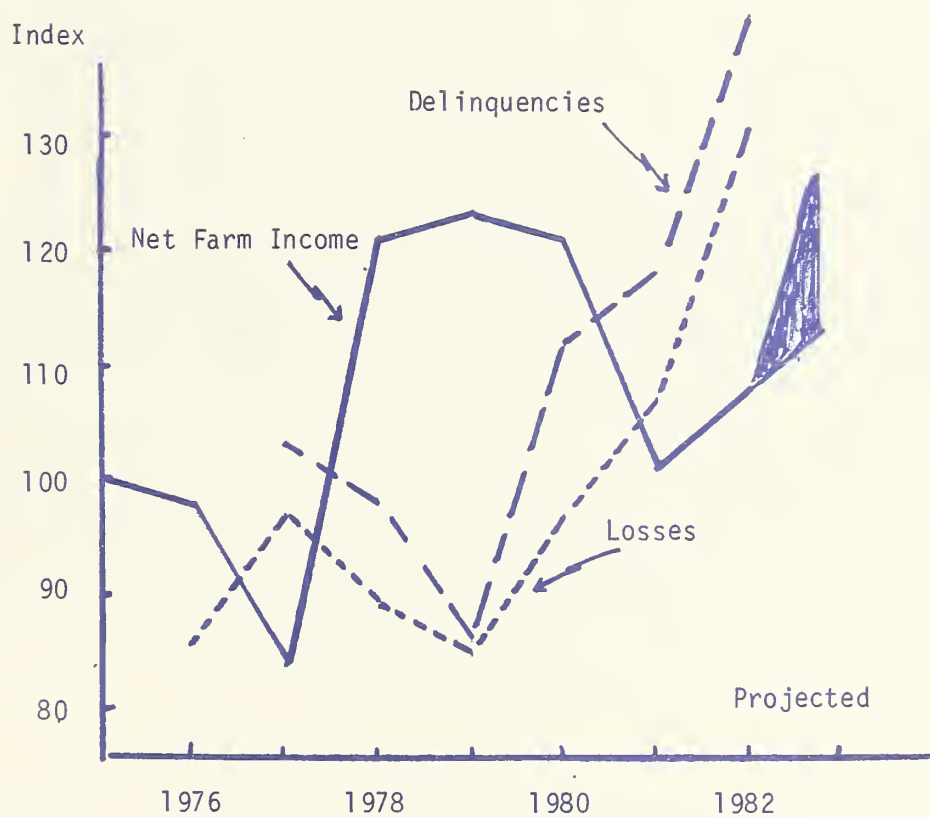


Figure 2. Index of Net Farm Income and Indices\* of Farm Loan Losses and Delinquencies at Ag Banks, Mid-year.

\*Indices constructed by subtracting the percentage of banks reporting decreases from those reporting increases and adding 100. Index of net farm income, 1975=100.

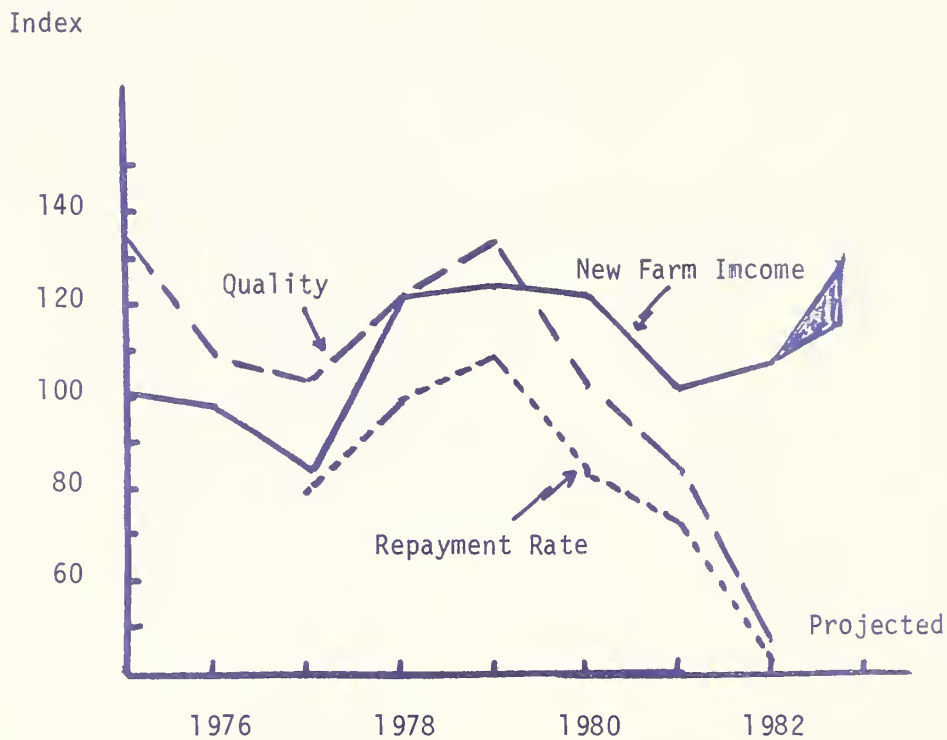


Figure 3. Index of Net Farm Income and Indices\* of Farm Loan Quality and Repayments at Ag Banks Mid-year

\*Indices constructed by subtracting the percentage of banks reporting decreases from those reporting increases and adding 100. Index of net farm income, 1975=100.

Real estate debt outstanding rose a moderate 2<sup>2</sup>/<sub>3</sub> percent while nonreal estate secured farm debt rose about 8 percent.

The small increase in outstanding real estate debt occurred because land values declined and farm real estate transfers were depressed. Higher levels of refinancings, however, helped swell the total.

The PIK program curtailed the need for borrowing for operating expenses and with farm machinery sales depressed, nonreal estate secured farm debt rose by only 8 percent. This was the smallest gain in over a decade for this component of farm debt. Commercial banks registered a 7-9 percent gain over their mid-1982 level and CCC outstandings were up more than 60 percent. However, non-real estate debt outstanding in mid-1983 was down from the year earlier amount for PCA's and FmHa.

In the year ending mid-1983, the weakest demand for credit would likely have been in the regions where land values declined the most and PIK program participation was the greatest. This includes the grain areas of the Midwest and the grain and cotton areas of the South. Strongest credit demands during the past year would likely have been in the livestock, poultry and dairy areas of the West and Northeast.

In 1984 credit demands are likely to undergo a recovery from the depressed levels just described. Land values have come back some and market activity is likely to pick up, bolstering real estate lending. But, what is more important, is the expected increased demand for credit as planted acreage returns to pre-PIK levels. Farm machinery and equipment sales are also likely to be helped by this prospect for an expansion in planted acreage as well as by improvement in 1983 net farm income.

Credit demand in early 1984 may not be as strong among livestock, poultry and dairy farmers as feeding margins turn sour. These views indicate a likely reversal in credit demand between 1982-83 and 1983-84. The areas experiencing the weakest demand last year are likely to show the strongest gain in the current year. And the areas registering the strongest gains last year may be the weakest, comparatively speaking, in 1983-84.

#### LOAN FUND SITUATION

In mid-1982 ag banks responding to ABA's annual mid-year survey reported they had ample funds. Their average loan-deposit ratio was 62, down substantially from the high of 67 registered in 1979. The ratio for a group of ag banks identified by the Federal Reserve System shows<sup>3</sup> a continued decline in the loan deposit ratio between mid-1982 and 1983. Thus, available funds for farm lending at rural banks continues plentiful.

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<sup>2</sup>Melichar, E., Preliminary estimates of farm loans at insured commercial banks and liquidity ratios at agricultural banks as of June 30, 1983. Mimeo, August 19, 1983, Board of Governors of the Federal Reserve System.

<sup>3</sup>Ibid.

This is not surprising in light of the weak farm loan demand of the past year. Changes in loan deposit ratios between mid-1983 and early 1984 will be affected by drought and funds derived from the PIK program. Drought tends to slow repayments and cause deposits to be drawn down while PIK funds should swell deposits. Overall, the average loan deposit ratio at ag banks in early 1984 may not show much change from current levels. Thus, even should there be a surge in farm credit demands in the first half of 1984, it should be satisfactorily accommodated by banks, units of the Cooperative Farm System and FmHA.

An interesting feature concerning the suppliers of credit is that for 13 consecutive quarters (from the fourth quarter of 1978 through the fourth quarter of 1981), annual rates of increase in outstanding farm loans were greater for PCA's than for commercial banks, figure 4. This was a period of tight credit and increasing interest rates. However, for the last six quarters (the first quarter of 1982 through the second quarter of 1983), the annual rate of increase for banks exceeded that of PCA's. This was a period of increasing availability of funds and lower interest rates.

Over approximately this same period FmHA annual rate of increase slowed from more than 50 percent in the 1978 to 1981 period to virtually no change in mid-1983. This recent experience indicates that changing market shares of major farm lenders seems to depend more upon government policies and conditions in the money markets than upon the nature of the products and services provided by the institution.

Interest rates on nonreal estate farm loans at all banks averaged 13.3 percent in mid-1983 compared to 17.8 percent a year earlier according to data compiled by the Federal Reserve System.<sup>4</sup> Even though rural bank rates are more closely related to conditions in the nations money markets than in earlier years, it is interesting to note that as interest rates rose to their peak in the third quarter of 1981, bank rates on farm loans did not increase as fast as on business loans. At the peak, average rates on farm loans were about 2 percentage points below the prime. Since the interest rate peak, bank farm loan interest rates have declined more slowly than the rate charged on business loans. In mid-1983 they averaged about 2.5 percentage points above the prime rate.

Judged by this recent experience, should the general level of interest rates move higher, farm rates are likely to be more sticky and lag behind, especially given the plentiful supply of funds at ag banks.

On the other hand, if the general level of interest rates remains about the same or declines, bank farm lending rates could continue to ease. Movement of the general level of interest rates, either up or down, would, therefore, likely bring farm rates closer to the prime and that charged by banks on business loans.

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<sup>4</sup> Melichar and Balides, Agricultural Finance Data Bank, Monthly Series, August 1983, Board of Governors of the Federal Reserve System.





Figure 4. Percentage Change from Previous Year by Quarters for Selected Lenders Providing Non Real Estate Secured Farm Credit

\*In 1978 FmHA rates of change ranged from 85 to 106 percent.

## THE STRUCTURE OF THE FARM SECTOR AND THE CHALLENGE TO FARM LENDERS

An evolving feature of the farm sector which I believe requires lenders' careful scrutiny is the tendency for the units composing the sector to separate into two groups--small and large farms. Farms between these extremes seem to be declining at the fastest rate. Perhaps the in-between sizes are too large to be operated as part-time farms and not large enough to be full-time farms.

On average, the smallest farms are almost solely dependent upon off-farm income for their income and they use credit sparingly. On the other hand, the large farm subsector is largely dependent upon farming for its income and it uses large amounts of credit. By number it accounts for only about 12 percent of all farms but uses 65 percent of the sector's total outstanding debt. While it has what appears to be a conservative debt-asset ratio (21 percent), it averages higher than for any other size group of farms. But what is more important, they have a high ratio of expenses to gross receipts. Because of this high gross ratio, relatively small changes in commodity prices, production, or expense items (including interest charges) can have serious repercussions on the ability of a firm to meet its financial commitments. One thing lenders and borrowers learned from the 1981-82 experience was how quickly highly leveraged firms can get into difficulty when conditions turn adverse.

Lenders' responses to adverse conditions are many. They include strengthening loan procedures, analysis and documentation. Responses also include identification of risks and encouraging borrowing firms to employ appropriate risk reducing strategies. Managing these risks is a major concern and seems likely to become even more important in the future.

One way to protect a firm from financial risks is to employ modest levels of debts relative to assets. This strategy, however, poses a challenge of a different sort. In order to adopt specialized, capital intensive technologies, more debt capital may have to be employed. In an environment characterized by risk, expansion of the debt ratio may only be possible for managers able to successfully employ risk reducing strategies.

The challenge to lenders is to deliver necessary debt capital, appropriate financial services, and expertise regarding risk-bearing techniques in order to adequately service the large farm subsector. The required level of financial expertise to deliver these products to large family farms may not be present at all farm lending institutions. A midwest banker expressed this view as follows: "Large farms are too large for us to serve and the small farmer doesn't generate enough business for us; we are reducing our commitment to serve the farm community."

As the farm sector continues to divide into large and small farm segments, a similar alignment is expected to occur among farm lending institutions. A large number of smaller rural community banks will

likely continue to provide for the less specialized needs of the large number of smaller farms. Some PCA's and FmHA offices may also specialize in serving this market as they are located where such farms predominate. But their market share of the total sector debt will likely decline. However, the bulk of the operating and term credit needs of the large farm segment will be met by a smaller group of larger or at least more specialized ag banks, PCA's and FmHA offices.

Should farm lending institutions not provide adequate finance, make available related financial services, or risk bearing technologies, capital will still flow to the sector, but through different structures. Corporations, agribusiness firms, integrators, leasing firms, to name some, will provide the capital and increase their control over farm production. The challenge to lenders is clear. In the future their market share may be more dependent upon the quality of the financial products and services they deliver than in government policies affecting fund availability and interest rates.

#### SUMMARY AND CONCLUSIONS

Improvement in 1983 income projected by the USDA and the likely improvement in farm sector equity should strengthen the quality and condition of farm loan portfolios from their dismal level of a year earlier. The PIK program is an important contributor to this assessment. While some farmers continue to be in financial difficulty related to drought and other conditions, disaster and other loan programs provided by the FmHA will be helpful to their recovery. Improved crop prices encourage lenders to stay with their customers and ample funds provide banks with the ability to continue to finance their customers.

The prospect for a significant increase in the demand for farm loans in the first half of 1984 should be satisfactorily accommodated. Ag banks have adequate funds, judged by their loan-deposit ratios.

In the longer run, lenders are being challenged to adequately deliver credit and financial services to the large farm sector if they are to maintain their market share. In the future the name "ag lender" may only apply to those with the specialized expertise and ability to deliver credit and financial services to this market.

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My assignment today is to focus on the characteristics of the family farm of the future including its needs and importance as we prepare to enter the 21st century. The paper is based in large part on a report entitled The Future of the United States Agriculture 1983-2000, a study sponsored by the Production Credit Associations as a gift to the nation's agriculture in celebration of 50 years of service by PCAs. The study was conducted by Battelle, a consulting organization based in Columbus, Ohio. While a substantial portion of the thoughts for the paper are drawn from this study, I have also drawn from my own thoughts, experience, and observations about the future for family farms.

It would appear that the family farm will continue to be the dominant form of organization for commercial agriculture in this country as we approach the 21st century. Commercial farms of the future will continue to be family oriented in the sense that members of the family will supply or control the majority of the management and capital employed in the firm, although increasingly less of the labor. However, commercial family farms of the future will be larger and more sophisticated than their counterparts of the early 1980s as advances in agricultural technology continue to improve productivity and efficiency. These future technologies can be summarized as follows:

#### "Crop Technologies

The future crop farm will concentrate on increasing production efficiency and resource utilization. Foremost among the resources will be water management which will utilize drip or trickle irrigation in conjunction with low energy precision application systems for delivering water to crops when it is needed. The use of antitranspirants to inhibit water vapor loss will also contribute to higher crop yields.

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Plant breeding and genetic engineering will develop crops that have greater disease, insect, nematode, and herbicide resistance. This higher resistance will reduce stress on crops and increase yields. The development of crops for particular regions, for example, salt tolerant wheat for the western United States, will enhance agricultural production in marginal areas. The use of plant growth regulators, nitrogen fixation for selected crops, and more precise pesticide application will increase agricultural production and reduce environmental problems created by pesticide and fertilizer runoff.

### Agricultural Mechanization

Agricultural equipment will become more expensive and complex but will increase farmers efficiency by reducing time and labor in the field, increasing crop yields or reducing crop losses, improving crop quality, reducing fuel and crop drying cost, and improving the efficiency of fertilizer and pesticide application.

Automated equipment will increase harvesting efficiency by sensing harvesting losses and making automatic height and speed adjustment on uneven terrain. Microcomputers will be used to properly balance operating speeds with crop harvesting efficiency. Field conditions will be monitored by sensors that are linked to satellite weather forecast to aid in irrigation scheduling. Controlled traffic farming will optimize water use by reducing soil compaction, providing better water infiltration, and reducing water loss and soil erosion. Custom-prescribed tillage will precisely specify the tillage to be used on a particular crop based upon the desired seed bed, anticipated pest problems, soil type, terrain, and water availability.

### Animal Agriculture

Animals will grow faster, be more disease resistant, use less feed per unit of production, produce more milk, meat, and eggs at specific quality levels, and will reproduce more offspring per animal, each with more desirable genetic characteristics. Genetic engineering technologies will shorten the time span needed to upgrade the population of cattle, swine, and poultry. There will be a continuing trend toward more nutritious feeding rations supplemented by precise levels of minerals, vitamins, and amino acids.

The increased ability to create an animal to produce a specific product for a specific market will result in greater coordination of production and marketing through vertical integration or contractual relationships between farmers and processors of livestock and poultry products. These changes will result in marketing being targeted to specific market segments by various agricultural organizations.

#### Communications and Information Management

Accurate record keeping for animal agriculture will become more important in the future, particularly as confinement production systems are adopted and animals are more easily controlled and monitored. Monitors using microprocessor and sensor technology will provide quick and easy access to information on feed intake, health status, and production efficiency. Livestock producers must be capable of utilizing the mass of information and growth rates, feed consumption, feed costs, market prices, etc. to make better business decisions and to increase their profits. More time will be spent on evaluating various options, and planning and controlling resources more efficiently to maximize producer profits." <sup>1</sup>

In addition, farms will be entering a new era in terms of financial and information management. Farmers will increasingly prepare and utilize financial statements and cash flow projections for their businesses as well as using a host of decision making aids such as least cost feed formulation, lease versus buy, and capital investment analysis. Financial analysis and management will become increasingly important in determining the success of family farms and will require the utilization of significant computer capacity for processing and analyzing information.

The investments in technology and computers will be substantial for the family farm of the future, although necessary to assure efficiency, and hence profitability, of the farm business. It will take substantial amounts of capital to finance the acquisition and implementation of these new technologies and computer capacity. Assuming that agriculture remains a healthy and vital sector of the economy, the capital to finance such technological improvements should be forthcoming. Capital will be supplied by essentially the same mix of entities and institutions which now supply capital to American agriculture. That is, the Farm Credit System and commercial banks will continue to supply the bulk of credit used by farmers with a continuing role played by the government through programs of the Farmer's Home Administration as well as Commodity Credit Corporation.

1. The Future of United States Agriculture 1983-2000, Battlle, Columbus, Ohio, February 15, 1983, pp E-3, E-4

In addition to utilizing the traditional sources of debt capital, farmers will increasingly utilize leasing as a source of capital when it is their financial advantage to do so. Lease capital is expected to play an increasingly important role in financing the acquisition of technology and assets for farmers and, predicated on the continued financial health of the agriculture sector, should be available in adequate supply to meet farmers needs.

In addition to debt and lease capital, increasing attention will be paid by farmers to obtaining outside equity capital. This may come in the form of the sale and lease back of specific assets, such as land, or in the form of sales of minority stock interests in family farm corporations. In short, farmers will increasingly look for the optimum mix of debt, lease, and equity capital to use in funding their acquisition of new technology and assets as well as for their ongoing operations.

Coincident with the increasing importance of financial management in determining the success of the farm business, the demand for financial services on the part of farmers will significantly increase as well. Certified public accountants, tax advisers, marketing advisers, farm management specialists, and computer experts will become increasingly important in a consulting way to help farmers make optimum management decisions for the future. As farmers needs for services expand, those needs will be met by an increasing number of practitioners in each of these areas. In effect, the family farm will utilize a wider range of financial service and consulting inputs than has historically been the case and will expect these services to be bundled or packaged together by suppliers.

The net product of the application of these new technologies and utilization of financial services and consultants should be improved financial management and profitability of the farm firm.

There will be changes as well for the future in the overall quality of life in rural areas. Parallel to the increasing size and sophistication of commercial family farms will be a continuation of the trend toward small and part-time family farms where a substantial portion of the income is provided by off farm employment. The specific characteristics and quality of life in rural areas will continue to be influenced by major national and regional trends. Primary among those trends identified in the study are:

- "1. Continued growth of suburbs into rural areas; continued dispersion of the U.S. population and decentralization of employment.
2. Changing composition of rural population due to migration patterns; adjustment of rural communities as new residents are integrated into the social structure.

3. Greater mixing of rural and urban lifestyles.
4. Declining differences between rural and urban residents in terms of educational obtainment.
5. Decreasing gaps in level of community service between rural and urban areas.
6. Decreasing gaps between rural and urban incomes, although regional variations will exist. Farm families will continue to earn a large portion of family income from off farm employment.
7. Increasing percentage of two or more workers per household, including greater female labor force participation.
8. Public measures, such as government programs and preservation of agricultural land, will continue to have major impacts on rural communities and farm structure.

The diffusion of telecommunications technology will significantly affect rural communities. Electronic mail, two-way television, satellite communications, and innovations will improve the quality of rural life by improving educational opportunities and health services. Improved services may not necessarily mean greater community satisfaction as individuals will tend to increase their expectations as their environment becomes more satisfying. Providing residents with higher levels of community service and better facilities will concurrently increase rural residents expectations for continued improvements. A major challenge for rural areas will be to maximize the potential benefits associated with demographic and other socio-economic changes anticipated to occur, while at the same time minimizing potential negative impacts-to maintain and enhance the quality of rural life." 2



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Agricultural Representative  
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The "family farm," broadly defined, is likely to remain the dominant type of firm in U.S. production agriculture for many years. However, to stop at that would gloss over a crucial question regarding the emerging structure of farming and livestock production in the United States: How many full-time commercial family farms will be operating by, say, the year 1990?

There seems to be a continuing general consensus in this country that the number of independent farmers and livestock producers really matters, and that the nation needs to foster an environment in which middle-sized family farms that are managed with basic competence and integrity will be able to build and maintain equity positions for sound agricultural operations.

Clearly, all farmers will need to be active, risk-taking managers, availing themselves of new technologies on an aggressive basis. Furthermore, the smaller full-time farms will often need to get larger, and many will not survive. Nonetheless, the future direction of the family farm in the United States depends a great deal on what Congress and the Administration decide in regard to basic agricultural policy in the months and years immediately ahead.

Local community-oriented banks and family farms tend to have common concerns in this area. While commercial banks of course finance all sizes of agricultural producers, the typical borrower from community banks tends to be the middle-sized, commercial family farmers. Those banks' and farmers' future success is therefore closely related.

Agricultural producers' greatest competitive challenge in the months and years immediately ahead is likely to involve the management of their finances, particularly as related to marketing decisions. A recent survey of 535 innovative farm producers, agricultural lenders and consultants conducted jointly by Arthur Andersen & Company and the University of Illinois showed that "innovative agricultural producers are adopting sophisticated accounting systems, small business computers, periodic financial statements and outside management consulting services to manage their farm finances." That study interpreted these management practices as being essential "to cope with an increasingly complex economic environment" in which "physical production management is no longer the key indicator of success," and predicted that other commercial farmers and ranchers are likely to adopt the procedures of today's innovative producer.

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In this scheme of things, will there be a viable niche for those tens--indeed hundreds--of thousands of full-time farm units which, due to size and related factors, are limited in their access to specialized marketing and management tools? Perhaps more to the point, will the Federal government foster an environment in which farm and livestock producers of smaller size (but who are competent managers and are efficient in producing) can cope with the emerging situation?

This will require a focused effort, because there will continue to be pressures for the government to intervene in the farm economy at least on an ad hoc basis to protect equity investments from deteriorating. The highly-leveraged and highly-price-volatile farm production economy will generate those pressures, and the 1983 PIK program is an example of that type of rather unstructured intervention. However, from the medium-sized family farmer's perspective, the need is for a structured policy with more emphasis upon their needs.

If government is to fulfill a policy responsibility for fostering medium-sized family farms, then Congress and the Administration will face unusually difficult decisions regarding policies administered by key USDA agencies--including the FmHA and the stabilization agencies such as ASCS and CCC.

#### Farmers Home Administration

Regarding the FmHA, the agency in actuality has gone beyond the role of "lender of last resort" and has, in effect, become the "financer of last resort" for an increasing percentage of farm operators. With debt stretch-out procedures such as refinancings and repayment deferrals, the agency has substituted mounting debt for inadequate realized farm income for many of its approximately 275,000 borrowers. At the same time, the capacity of the agency to provide useful technical assistance which might be a dominant factor enabling FmHA borrowers to graduate to commercial credit status is almost nil--due to personnel constraints, heavy caseload, the increasingly complex farm management environment, and the uncertainty of future farm price and income levels.

These developments are not basically the fault of the FmHA. The agency has simply become the bottom safety net in a "family farm protection policy" which the Congress has tended to keep in place. Any basic relief from FmHA's burden must occur up the line: farm prices and income need to be adequate on a more stable basis for family farmers who have demonstrated competence and integrity to be able to service their debt.

Pending improvement in the broader situation, there is need for FmHA to renew its focus on family farmers of limited size rather than to reorient its direct/insured lending toward stronger commercial farms who should be able to secure credit from commercial sources.

### The Stabilization Agencies

Regarding the stabilization aspects of agricultural policy, there is need to reform and renew the complex of price supports, incentive payments, storage and reserves, exporting efforts, and other mechanisms administered primarily by the ASCS and CCC. These are the means through which the government underwrites minimum returns from farm marketings and reduces the volatility and extremes of risk, so that competent but smaller producers can make decisions while protecting their basic equity. Especially since we appear to be moving through another period of chronic overproduction in U.S. agriculture, such a support system will need to be related to the costs of production of efficient producers--not merely to an ill-defined world price. The basic problem involves the structuring of a workable policy which achieves equity among producers on a rather stable basis, with emphasis upon the medium-sized family farms, since as indicated continued government involvement of some type is virtually inevitable.

Such a policy could possibly prove unattainable when Congress seriously attempts it again. In that sense, family farm policy is indeed facing a crisis situation. At a minimum, such a policy will necessitate new combinations of conserving uses of marginal cropland, voluntary incentive programs for cropland diversion, exporting efforts, required production restraints, and other elements. It will also need to achieve a better balance between a reliance on credit and a basis for more stable and adequate farm prices and income.

If policies such as these should prove no longer attainable, the basic alternative is greater "deregulation" interspersed from time to time with ad hoc government intervention to keep commodity surpluses from running out of control and to buttress the broader equity structure of agriculture. In my judgment, such an alternative would lead to a more concentrated structure of family farm agriculture than is desirable, and would also contribute to undesirable concentration in banking and other local institutions which serve and are served by the family farmer.



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## FAMILY CAREGIVING FOR THE ELDERLY

Our discussion today is focused on longterm and supportive care for the elderly in the United States. I will present some ideas which I hope will be provocative and useful in extension work with families.

### DEMOGRAPHY

We have all been made aware of the changes in our own country in the percentages of the different age groups in our population and know that the changes have been most marked among the very old. This paper will address the changes in regard to those over 65 and their needs for care from society and their families. I will be paying special attention to those who are doing the caregiving.

Before coming to focus on our own country, it is interesting to note that the massive changes in the population mix seen in the Western countries are also occurring world wide. Projections from a United Nations study, prepared for an "Expert Group Meeting" in 1978 showed that worldwide the developed nations contained over half the 60+ age population of the world in 1970, but that by the year 2000 more than 60% of those 60 and over will be living in the less developed countries.<sup>1</sup> In addition, the percentage of the 80+ will increase in the populations of all countries of the world.

Turning to the sex composition of the world population, with the exception of South Asia, every geographical area of the world had more women than men among the 60+, and even this exception is projected to disappear by the year 2000. Among the 80+, every geographical area shows more women than men even in those countries where the dangers of child birth still tend to even out the survival rate.<sup>2</sup>

This quick summary has shown that the demographic explosion and the sex mix of the elderly are common the world over even though they differ in actual percentage of the population because of the longer life expectancy in the developed countries.

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In the United States there are 15.2 million women and 10.3 men 65 years of age or more, 148 women for every 100 men. This ratio rises to 180 women for each 100 men in the 75+ group and 229 women for each 100 men in the 85+ group. This difference is due to some unexplained male-female physiological difference which appears to operate world wide, as we have noted above.<sup>3</sup>

In part because of the sex ratio, there are differences in marital status. In 1980, 78% of older men were married, while only 51% of women were married. Among the 70+, only 24% of the men but 67% of the women are widowed.<sup>4</sup> This means that seventy five percent of men but only 38 percent of women over 65 live with their spouse. For women 75 and above, only about a quarter are living with a spouse, a quarter are living with relatives and half are living alone or with non relatives. Two thirds of the men of this age are still living with a spouse, less than 10% living with relatives, and less than a quarter are living alone or with nonrelatives.<sup>5</sup>

#### WHO NEEDS AND GIVES CARE?

Nineteen percent of the men and 8% of the women over 65 are still employed. Most people over 65 are physically able to take care of their daily needs even though a 1977 study indicated that 45% of all over 65 reported some limitations on their "usual" activity because of a chronic condition and might well need help with heavy chores and shopping.<sup>6</sup>

At any one time there are only about 5% of the total over 65 population who are in an institution of any kind, although about 20% will have some hospital or other institutional experience during the course of a year with the incidence much higher for those over 85. The study mentioned above showed there are nearly another 5% at home as frail as the 5% in institutions and these are the ones who must have someone living with them in order to stay out of a nursing home. For families who take on this role the strain can be very great indeed. An additional 14%, while not in bed or needing help in getting around in the house, need help getting around in the community.<sup>7</sup> These are the ones who can get along with help from friends and family or community services without live-in help.

Money for chronic in-home care is very limited both in the Medicare and Medicaid programs. Only recently have waiver programs and other experimental programs been introduced which are testing out the effect of providing more community money instead of insitutional care. Several European countries have much more developed programs which more nearly reach the level of one paid professional homemaker for each 100 persons over 65 in the population which is an appropriate level according to agreement at an international meeting. According to this standard, the United States should have over 200,000 paid homemakers to adequately meet the needs older adults alone. In the late 1970's we had only 30,000 to meet the needs of the total population<sup>8</sup> and of course this gap was filled by family members and friends. It has been estimated that between 10 to 40 percent of the institutionalized elderly could be cared for in the community,<sup>9</sup> but this would entail a much greater commitment to community care on the part of the government and would necessitate much more

effort to provide the family supports which would be required.

This paper is concerned with the family aspects of caregiving for the elderly. In the United States there is the tacit assumption that caregiving is a family responsibility and it is generally estimated that 70 to 80% of the long term care provided in the community is now provided by families.<sup>10</sup>

We have noted that most men live with their spouses while most women live with relatives or alone. This makes a big difference in who is available to provide needed caregiving. Since most of the men are living with their spouses it is most likely their wife who would be called upon to do the caregiving in case of illness. For women, spouses do give care and we all know of men whose devotion to their wives has been exemplary but we have no data to know how many spouses are providing all the care needed. We do know however, that the largest source of help for older women comes from their children. About 80% of all elderly have children and most have at least one child within a half hour traveling time. The quarter of women 75+ who live with relatives are most likely living with a child, most frequently with a daughter. Even when women live alone, sons and daughters provide the supports they need.

In 1980 a middle aged cohort of 100 people 45 to 49 had 210 people still living from their parent cohort aged 65 to 84. ~ If we assume only 5% of these parents as being so frail that they need constant care, we are talking about 10 or more of these children as being involved in arranging or providing care for their parents if there is no spouse. A 1980 cohort of 100 people 60 to 64 still had on the average 51 of their parent generation still living who would be over 80 years of age. We could expect that at least 20% of these would be needing complete care making 10 out of each 100 of this group 60 to 64, perhaps early retired themselves, who would have the care of an elderly parent. For this group of elders a surviving spouse is less likely and if there is a surviving parental couple both might need assistance. We can see that large numbers of middle aged and early retired people are each year involved in extensive care of elderly parents, and, since the population needing care is constantly changing with some moving in and others moving out of the frail group, many more children will be involved over their lifetimes. Those who provide the care their parents need have assumed their filial responsibility.

#### THE FILIAL CAREER

Before going further let us discuss the concept of filial responsibility and define a few terms. The word "filial" pertains to son or daughter, implying the relationship to parents. As used in this discussion, the filial relationship is used to mean the emotional state of affection or disaffection which exists between the adult children and their parents. Filial responsibility means the assumption of duties to ones parents which are required by law, custom, or emotional bonding. Responsibility can be financial, emotional support and/or time spent in care. Filial obligation is the feeling that one is compelled to accept filial responsibility.

Writers of current family life textbooks commonly discuss marriage and parenthood but do not address the adult child-parent relationship, the filial relationship. In the past, this omission was not as important as it is today since people were not living as long and fewer middle aged were finding themselves actively engaged in providing filial services to an elderly parent or even parents. The numbers of surviving parents for each cohort mentioned before are two and a half times as many as were living for similar cohorts in 1900. The new facts indicate that today having a surviving parent while you are in middle or even early retirement age is no longer a deviant situation but can be thought of as a normative period in the family life cycle. We are calling this period the adult filial career.

In a 1975 paper, Feldman and Feldman<sup>11</sup> proposed that the family life cycle concept should be enlarged to accomodate the new reality of aging parents as a normative experience. We proposed that the family life cycle should be thought off as consisting of three careers, the marriage career, the parenting career and the filial career. In marriage the relationship is one of equals. In parenting, the assumption is usually that the direction of effect is from the parent to the child, and that the actions of the parents will result in positive or negative development of the child. In the filial relationship, the direction of effect is from the child to the parent. In both the parental and filial careers there is an assumption of inequality at the early stages but a development toward equality as the child grows to adulthood. There may be some reversal of responsibility at the later ages of the parent.

Attention in family life texts has focused on marriage and parenthood with care for an older parent discussed only in terms of its potential disruptive effect on the other two. Just like marriage and parenting we think there are stages in the filial relationship and have tried to delineate them. We think there are four, but invite you to think about this and use the idea as a basis for discussion with groups you work with. The four stages we have noted are: bonding, differentiation, latency and finally, maturity.

#### STAGES IN THE FILIAL CAREER

1. Bonding: Unlike marriage and parenthood, the filial career begins at birth. The bonding of the child to the caring adults at birth is the potential beginning of a life-long reciprocated relationship.

2. Differentiation: During adolescence, as children move away from the parents to establish their own identity, this bonding becomes attenuated and there is a stage of differentiation.

3. Latency: During young and middle age we think the filial relationship goes into a stage of latency. In this stage the now-adult child is concerned with his or her own career and new family so that concern for the parent is not salient. So long as the parent or parents are able to manage their lives and maintain their independence, the children are free to invest their energy elsewhere without guilt.

4. Maturity: The stage of filial maturity is achieved when the grown child is able to accept the parents as individuals in their own rights to be seen as having strengths and weaknesses and to be loved and appreciated as persons, not only as parents. Rick Rubin, writing on men in *Psychology Today*



(June 1982) writes, "the goal of father-son relationships is 'the establishment of a friendship between equals'". It is the same with mothers and daughters and with all children and their parents.

During this stage, the adult child has to come to terms with the fact that aging parents may not be able to continue giving economic and emotional support but may require such support for themselves.<sup>12</sup> The test for filial maturity comes when there is an actual need for assistance. For some adult children, the development of parental need is gradual and just expansion of the normal reciprocity of relatives. For others, concern comes suddenly with a death of one spouse of a couple, a sudden deterioration of health or an accident which precipitates a filial crisis.<sup>13</sup>

The filial crisis is characterized by a sudden awareness of the mortality of the parent and a shocking notice that the adult child has responsibility for the parent. The child has to decide what he or she can do, and even more difficult sometimes, decide what he or she ought to do. What is the filial obligation of children for their parents? Unlike the coming of parenthood which is an anticipated event which allows planning and which can be expected to lead a rather normative course, the rules for filial responsibility are vague and the duration of filial concern can never be predicted. It may be that the filial crisis comes at a time which is not at all convenient for the adult child. The necessity to provide support may be extremely disruptive to a marriage and to the ongoing processes of the young family. Or, on the other hand, the time of filial responsibility may come at the time of a woman's reentry into the work force to provide income for her children's college or her own economic survival. It may even come at a time of retirement for the younger couple who may feel that finally it is their turn to be able to do what they want to.

We have been discussing what might be thought of as a potentially normative career which is new in the lives of increasingly larger numbers of middle aged families today. Like any developmental scheme, we can hypothesize that there will be aberrations in the parent child relationship which will affect achievement of filial maturity. Some children may remain very bonded to their parents because they never really developed the independence expected at adolescence. These may continue to fight psychological battles. On the other hand, there may be either too much bonding or too much independence so that children might reject the whole idea of being responsible. Still others might feel tremendous strain and guilt about the necessity to make a choice between what they see as the best interests of the parent, on the one hand, and the child or the child's family on the other. A great deal of maturity is demanded to make the best decisions without excessive guilt when the needs of many must be balanced among each other.

#### RESEARCH ON FILIAL RESPONSIBILITY

In 1981 we conducted some research to try to learn about people's attitudes toward filial responsibility. We found some interesting relationships between filial responsibility and reported child rearing by the respondent's mothers.



We were able to get responses from 532 people from high school age to old age. Our questionnaire included 15 items on filial responsibility, and four items which asked the respondent to say how much their mother had supported them, rejected them, used democratic methods of control and exerted pressure for achievement. We factor analyzed our results and named the factors. Three of the factors are especially interesting for this presentation. The first was an overall factor indicating support for filial responsibility. The second could be thought of as overly differentiated feelings of responsibility and the third as non-contingent bonding. Unfortunately this research did not include items which could be thought of as measuring filial maturity directly although overly bonded or overly differentiated attitudes could be considered to be at a less mature stage.

There was very strong support for the idea of filial responsibility among our whole sample, as shown by a mean of 4.24 on a scale of 1 to 5 with 5 being high. A sample item is, "Even if elderly parents have no money, their adult children owe them respect and encouragement." Rather than measuring filial maturity, we thought this factor measured a normative standard of belief in our society. The second factor was labeled Denial of Filial Responsibility and had a mean of 2.11, showing that not many of our people were rejecting responsibility. A sample item was, "Adult children should be expected to care for their elderly and infirm mother only if paid". The third factor we called Non-Contingent Filial Responsibility. The mean was 2.88, showing rather more ambivalence. The index item was, "Even if an adult child has to stop work to do it, she has an obligation to care for her mother when her mother can no longer take care of herself".

It is provocative that Denial of Responsibility was correlated with a feeling that mother had not provided support as a child and had been rejecting, but this was only true for males. Non-Contingent Responsibility was correlated with support from the mother, but this was true only for the women. For the men, the quality of the mother's support seems to have been crucial, leading to a reciprocity of affect in these adult children. Among the women there was not an effect from rejection because women's behavior is much more role determined. It was only when there was a lot of support that women became heavily bonded.

Parent- and family-life educators have been advocating parental support because of its positive effect on children. Here is evidence that the quality of that early parenting can have a long term effect on the degree to which the child will accept some responsibility for the parent when the parent becomes elderly.

Part of our sample for this research consisted of high school and college students and their own matched mothers. For this subsample we were able to compare the answers of two generations and to look at the continuities of attitudes from one generation to another. We found support for our idea of development of the filial relationship. We found that the younger people were higher on acceptance of filial responsibility and also were less likely to reject filial responsibility, both part of the normative attitude. They were

also more likely to support non-contingent responsibility. It seems that the children are more caught at the bonding stage while the parents have moved away toward independence and maturity. We can hypothesize that the middle aged mothers of these students were either involved in parent care or were looking ahead to that possibility. In an additional sample where we did have some very much older women, we found that they were very ambivalent about non-contingent responsibility. Older women did not want to accept heavy responsibility for others or be a burden on their children.

One part of our research included an intercorrelated set of three scales which we labeled the New Right. It included politically conservative attitudes, fundamentalist Christian religious beliefs, and a belief that women should take a traditional role in the family. We found that these scales were significantly correlated with our variables of rejection and non-contingent responsibility. Acceptance of the traditional role for women had the highest correlations of any of the three New Right variables. Even though our older more mature women were the highest on belief in traditional roles, they also were the lowest of any age group on non-contingent responsibility. Belief in noncontigent responsibility was highly correlated with fundamentalist religious belief and seemed to follow from the Biblical injunction to "honor thy father and mother". Males were more conservative than females and much more likely to accept traditional roles for women, including having a woman give up a job to care for her elderly mother.

#### WOMEN AS A FOCUS OF POLICY

The fact that men and women seemed different in the ways in which the filial responsibility variables were related to child rearing brings up the question of caregiving as a female activity. Carol Gilligan, in her book "In a Different Voice"<sup>15</sup> develops the idea that we cannot think of men's and women's experiences during their development as the same. Since women never have to separate from their mothers in the same way men do, they are more tied to relationships and develop a different empathy for others, especially family members. Moral questions of obligation and responsibility are much more salient to women and more likely resolved in terms of relationships. Our findings support this idea.

We have already noted that the majority of the old-old are women and that these are most likely to be widowed and cared for by daughters. Sons continue to do the traditional things sons do, provide economic counseling and some driving and chores, but the physical care is most likely to be given by a daughter or daughter-in-law. We could wish there was a most equal distribution of nurturant activities, and it may become so in the future as more young men are taking on the nurturant role with their children. Until that day, however, we have to consider that women are those most concerned in filial care, even though men are also very concerned about their older parents.

What is to be gained by focusing on the woman as the caregiver? It allows us to consider the family as a system and lets us consider the woman's needs and the needs of the total family when developing policy options. Woman's role has traditionally been that of nurturer in the family with the



main policy concern that of raising the children. This is an inadequate analysis since it does not take into account either the marriage or filial careers. Judith Agassi<sup>16</sup> asked elderly Jewish immigrant women in Israel to list all the breaks in their work lives and to indicate the reasons for the break. She was surprised to find that nearly as much time had been lost from a work career because of the need to care for husband and elderly parent as had been lost because of child illness and needs. Women's responsibility in the home does not consist only of raising the children and doing the housework.

In our own country there is evidence that as the children leave the home, many homes are filled again by an older person. An analysis of women's dual role in caregiving was performed by Beth Soldo<sup>17</sup> using 1977 data (update pending). Her analysis showed that for the age group 40 to 44, 75% of women had children under 18 in their homes but for the group 55 to 59 only 11.5% had any children of this age. But 14% of this older cohort in the labor force and 15 % of those at home, had a person over 65 years of age in the home. Of course some of these are older husbands but most are older parents. These figures do not show how many older parents are living next door, down the block, or within the same geographical area who are being maintained in their homes by a daughter or daughter-in-law who does the shopping, arranges for medical care and transportation, and performs all the little services that enable the older person to feel "independent". Statistics are needed to tell us the percentage of adult children who, over the years, have provided for an elderly parent since any statistics, such as Soldo's, give only a snapshot view of one year.

In the United States we focus our social programs on certain target groups, but when money becomes scarce, such as at the present, there is apt to be competition between advocates for these target groups. This competition is potentially disruptive, particularly when we pit the needs of the young against the needs of the old. Instead of this competition we need to raise the level of discussion to a different level. For the dependent elderly being cared for at home or in the community, and for children being cared for by their parents, the true dependent group is the women who provide the care for both. And no social policy is truly valid which does not take into account the needs of these middle aged women, the women in the middle<sup>17</sup>, who should not be asked to sacrifice their lives and futures to provide care for others which in turn incapacitates them.

True filial maturity is being able to face up to the limits of one's endurance. Sometimes the stress of home care creates so much strain that the loving relationship which once existed within the nuclear family is broken down. Placement or help from outside can allow the child to take on the role of advocate rather than harassed caregiver.

#### PROGRAMS TO HELP CAREGIVERS

I have suggested that one way to provide care for the elderly is to provide services for the woman in the middle. The presently existing Dependent Care Tax Credit is based on this idea. This tax credit is given to a

worker who has to pay for substitute care for a dependent child, handicapped or elderly adult. Some people have likened the bill to any tax credit which is considered a cost of doing business. For others, there is recognition that this tax credit allows a worker, man or woman, to remain at work if they can find a substitute way to provide for the needed care. For all caregivers, those who work because they need the income and benefits or because they need it for their mental health, satisfactory services can make it possible for them to keep a loved one at home longer than would be possible without help. Better loving care can be provided after work because career and income are not being lost. Although the quality of the caregiving may be improved by having the contacts and interest of an outside activity, we must realize that the dual job may be overwhelming.

I think it is important to remember the different types of people we found in our research. Those who would reject responsibility might be encouraged to provide more care if there were more supportive services. Those who are willing to stop a job in order to provide care might be encouraged to become more mature and consider their own and their family's needs. The person who has achieved filial maturity will undertake the difficult task of trying to balance the needs of the elderly with their own needs will feel less of a burden of guilt.

The idea of parallel programs for children and the elderly brings up the possibility of industry providing a cafeteria of benefits for employees. There have been a few companies who have tried this and many others, including universities, are considering them. The idea is that the fringe benefits offered by the company could include some choice on the part of the employee. A particular employee would be allowed to select a cash payment toward day care for a dependent and this payment would be considered a cost of doing business for the company. Employees could then pay for care for a child, adult handicapped or elderly dependent. A company might even provide on site care if there were enough employees with elderly parents to warrant this benefit. The rationale is the same as any other benefit, it makes better employees who can have more peace of mind for their job.

What are other potential parallel programs? Parallel to child day care is adult day care. Some 800 adult day care centers already exist where frail elderly are provided with social, medical and nutritional services. The opportunity for the older person to meet with others and be cared for and stimulated in a supportive environment enhances the lives of the elders at the same time it allows the family caregiver either to work outside the home or have time in the home to pursue personal interests.

Parallel to maternity and paternity leave would be filial leave, when an employer would hold a job for a worker who needed to make short or long term arrangements for a parent. The maintenance of health benefits and the retention of the job would be especially useful to the older woman who may be unable to get another job if she returns to the job market after time out in her late 50's or early 60's. Continuity of employment is particularly important for a late entrant into the labor force in order to get in the required time to vest for her pension and to get sufficient social security quarters to



provide for her old age. A bill has been introduced into the Senate to allow two years of social security credit for a woman who is out of the workforce for child care. This could be extended to those who care for an elderly relative.

Parallel to recreation centers for children are social centers for senior citizens where once again social activities, and expressive activities are carried on for older people.

Parallel to the WIC program providing special food for women and children are the nutrition centers providing a noon meal to seniors with accompanying social interaction. Even more useful may be the meals on wheels programs.

There is no parallel with ADC which allows a mother a stipend to remain at home and care for her children. Except for a very few states and the VA there is no opportunity for a family member to receive a stipend for giving home care for an elderly infirm relative. Even though this idea has been explored, the governmental position is that the program would be much too expensive since all those women who are providing care for nothing will want to be paid. This is a clear recognition of the amount of care already being provided by women.

Each one of the already existing child programs, except public schools, is being resisted by those who clearly define woman's role as being in the home with no attention paid to the effect on her own old age. Equally so, each parallel program for the elderly, directed to help the caregiver rather than the older person him/herself, is also being resisted.

Where the parallelism breaks down, or should be followed with caution, is between filial responsibility and parental responsibility. Children are clearly the responsibility of their parents, and yet the state steps in when there is a breakdown of support. Filial responsibility was rejected as a requirement for help for the elderly when the social security and the Medicaid systems were put in place. After analysis at that time it was decided that the money recovered by the government would be very little, the negative effect on families potentially very large, and therefore that the imposition of filial responsibility would be bad policy. Recently there has been a resurgence of interest in filial economic responsibility for Medicaid recipients who are in nursing homes because of what is perceived as widespread abuse of the system. There is likely to be increasing debate about the merits of requiring responsibility since the administration arbitrarily changed the Medicaid rules making it now permissible for states to require payments from relatives. So far, I have not been able to find a state which has decided to make this a requirement.

Most women are expending great effort to provide the help their elderly parents need, including economic help, even though this involves the cooperation of sons-in-law. Sons are also providing economic and service helps to their elderly parents. The question really comes to the extremely heavy burden of nursing home care. Is the cost to be shared by all of society or is the cost of longer life to be born only by the children of each needy person?

## CONCLUSION:

This paper has only addressed the family aspects of long term care for the frail elderly, and has focused on the filial career as it relates to this care. The analysis of women's working lives and the effects of needing to provide care are equally valid when the person needing care is a husband, or in some cases, a husband providing care for a wife. We all recognize the need for analysis of the long term care system in its financial aspects but that is not the purpose of this paper. However, that analysis depends on what part the family is expected to play in the total system. Mention of a system should not be meant to imply that we have a coherent system for long term care. We do not, as any one knows who has tried to get appropriate care for a loved one. Families are the caregivers and the advocates for their elderly and provide most of the coherence except for very helpful services provided by social workers or workers from the Office of Aging. For the 20% of the elderly without relatives, the government provides assistance and all of us share in that assistance.

Facts about the demographic revolution have been presented to show that what we are experiencing is part of a world-wide revolution. In our own country, middle aged and early retired people are much more likely than ever before to have to take some responsibility for elderly parents. Although most elderly are capable and able to take care of themselves with only a little assistance, there comes a time in the lives of many when arrangements have to be made for a high level of care. How that care will be given is the policy issue.

I have suggested that the filial career be added to marriage and parenthood as careers in the family life cycle. The quality of the filial relationship is based to some extent on the quality of parenting, but among women it is much less important because of their highly developed sense of obligation which often drives them to sacrifice themselves and even their families to provide what they perceive as their obligation. Rather than full and complete acceptance of responsibility I have proposed that filial maturity includes a willingness to consider and balance the needs of all family members, including the woman who is in the middle.

Considering programs for the frail elderly as not only for the elderly as a target group, but as programs of support for the middle aged family led us to consider the parallels between programs for children and those which could be initiated, or exist, for the elderly. It was suggested that industry should enter into negotiations with workers to consider filial needs as well as parental and to consider filial leave as an appropriate fringe benefit.

The proposals listed in this paper are only some of the needed reforms which would be necessary to actually have a system for long term care in our country. For many adult children and their elderly parents, having options is only a dream because of the unfair and inadequate ways in which services are made available. This paper presented facts which show that large numbers of today's adult children are now or will be faced with providing care.

It is time for all of us to learn about our system of services. Costs must be contained but we must still provide services without continuing to base our non-system on the health and labor force participation of women which leads to impoverishment of the caregivers in their turn. Materials prepared for this year's lobbying effort directed toward passage of an extension of the Dependent Tax Care Credit, showed that more than a million women 44 to 58 are not seeking work because they are caring for someone in the home. One eighth of early retired women say they retired because they were needed at home for caregiving. There are women in every town like the one in mine who cared for years for her husband who had Alzheimers's Disease. As the years went on he became more and more violent toward her at the same time he could do less for himself. She could not get out of the house because of what he might do to himself or the house. She died before he did and at that point he went to a nursing home.

These are the women involved today. What about the future? This sounds like a topic worthy of study by extension. Equally important for extension, for those who are not doing so already, would be the provision of support groups for women found in every community who are actively engaged in care giving.

The demographic revolution and the alarming costs of long term care will demand thoughtful attention to the policies which industry and government can undertake. Perhaps more understanding of the filial career and of filial responsibility will help in the debates which must take place.



## NOTES

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THE DIVORCE PROCESS: DEVELOPING EDUCATIONAL PROGRAMS  
FOR INDIVIDUALS AND FAMILIES

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Introduction

We are experiencing today in the U.S. a divorce epidemic. The media batters us regularly with the statistics of aggregate marital dissolution. Since the mid-seventies our country has recorded roughly two million marriages each year, and roughly one million divorces. If this trend continues year-in, year-out — and there seems to be little reason to predict a great change in the figures in the near future — then we can expect nearly half of all marriages entered into today to end in divorce (1).

The statistics of aggregate marital dissolution are translated to all of us regularly in a very human, and painful manner. We see our friends, our relatives, our colleagues, ourselves struggling with what has to be one of life's greatest challenges: Coming to grips with aloneness, after the dreams of oneness have been unhappily shattered.

Indeed, there are books on Creative Divorce to remind us that good things do come out of bad. And researchers all across the country are hearing countless people tell them that "all in all, life turned out for the better." Each of us hears from people experiencing divorce exciting stories of individual growth, the development of personal competencies, the triumph of will over adversity.

And yet, the process of divorce is "no piece of cake." One young mother, attending law school and rearing a preschooler alone, did once tell me that divorce for her was, indeed, "a piece of cake." I probed and probed, skeptical of her allegations, but she seemed to be accurate in her terminology. The breakdown of the marriage and the divorce and its aftermath had been exceedingly smooth for her, remarkably clean.

This young woman, however, stands out in my experience as a teacher, counselor, and researcher who has for the past eight years been very interested in why people divorce and what happens when they do. Much more commonly I hear stories of how difficult it is to live in a failing marriage, and how difficult it is to make the transition to satisfying singlehood.

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### Developing a Program

In 1978 I decided that a good way to invest much of my life was in the burgeoning marriage enrichment movement. Not long after, we had a course on the books at the University of Nebraska-Lincoln called "Individual, Marriage and Family Enrichment." By all standard measures, the course appeared to be a success. The University was no doubt pleased, because each time the course was offered people appeared in ever-growing numbers. More than 70 showed up to take the course the last time it received tiny notice in the jam-packed schedule of course offerings printed each semester. The students in general were highly enthusiastic about the course when asked to rate it anonymously each evening after our sessions. And, some modest changes evidently occurred in many of their lives, for pre-test/post-test questionnaires indicated statistically significant gains on Likert scale-type questions purportedly measuring satisfaction with relationships. Modest gains, but significant.

There was something missing, however. As professionals we have a responsibility to not only try to help develop strong marriages; we also have, I think, a responsibility to serve those experiencing divorce. Most people who divorce will remarry, and the quest for a strong marriage can start just as easily when one is divorced, as when one is sweet, young, and never-married.

We began to develop, then, a course called "Coping with Divorce." It would look in depth at why marriages fail, and what happens when they do. The course would complement the "Individual, Marriage and Family Enrichment" course, which focused on how to make marriages succeed. As it turned out, the two courses operate quite successfully in tandem.

### Educational Philosophy and Method

David and Vera Mace (1975, 1976, 1978, 1979, 1983) have spoken and written eloquently on the notion of enrichment being a middle ground between education and counseling, bridging the best of both worlds. In our program we decided to present practical ideas which people could use to make their lives better, if they so chose. And, we wanted to develop a supportive atmosphere, making effective use of small discussion groups much of the time so that people would go away from our meetings feeling good about themselves and others.

The "Coping with Divorce" course lasts eight weeks; each session is three hours long. A typical session would begin with 10 or 15 minutes of banter on numerous topics: some funny or moving stories from real life; current events of interest; details on assignments or readings; questions and comments from the class. A short lecture might follow by the instructor or a graduate student who wanted 15 or 20 minutes to develop what s/he judged to be an important theme.

This would be followed by an hour presentation from a visitor or visitors with special expertise in a specific area of divorce and coping.

Or, a panel of what we called "just-plain folks" would discuss an issue. Panels might have two or three people, or as many as 10 or 12. There didn't seem to be any relationship between the panel's size and how well it went. Some large panels went exceedingly well; some small panels bombed. And vice versa. The instructor or a graduate student usually would moderate the panel, asking probing questions, and making sure that no one dominated the discussion, and that everyone got to participate.

We have found that an eight-session series works quite well. We have been successful going up to 16 sessions, but less than eight is not long enough. It takes about four sessions before people get comfortable with each other. After an hour and a half or two hours of large-group presentations and panels each week we would break up into our regular small groups. A graduate student receiving practicum work credit for the experience would be group leader for eight or ten class members. The first few sessions would be spent building rapport: telling stories, getting to know each other better. Some very serious discussions usually begin to occur in the small groups by about session number four. This is roughly the time when light bulbs begin to go on in people's heads, and they start saying, almost on cue, "Gee whiz, I thought I was the only person in the world who felt this way." Or, "Gee whiz, for a while I thought I was crazy, but I guess I'm just normally crazy."

We have aptly dubbed this the "Gee-Whiz Phenomenon." When a small group has reached this point, we know we are successful. Once a person feels his or her problems aren't much different than anyone else's problems, then the person can talk about these problems with a certain amount of openness. When someone opens up in small group, the other members almost invariably offer a comforting environment in which to tell the story, and a few good ideas on what to do next. The individual with the burden, of course, has the right and responsibility to pick and choose among the ideas. Every person must carry his or her own cross, even though there's a lot of advice given on how to avoid backache.

Honesty and openness are of high value to the group. We do not encourage people "to bare their soul," nor do we try to pander to anyone's "prurient interests." But, we have found that time was too precious to be spent floundering around and about while neglecting the "gut-level" issues; we most often choose to focus on the tough questions, for people aren't coming to class simply to pass the time.

As a teacher I have always looked somewhat dimly at mechanical marvels. I probably will be one of the last people dragged kicking and screaming into buying a home computer. (I didn't buy a pocket calculator until the price had plummeted to a small percentage of the cost of the original models.) I will use films and videotapes on rare occasion in class, but only if dead certain they will be helpful. Many times I see them used as only a way to fill time: white noise for students who wish to write a letter to their girlfriends. But one mechanical marvel that I cannot live without as a teacher is the teleconference hook-up. These can be purchased from a



telephone company for a few hundred dollars, or rented for a reasonable fee. We had the phone company put a wall jack in the room where class met, and if you adjust that \$15 expense for five years of inflation, I'd guess you could get that done today for less than \$30.

The teleconference hook-up is nothing more than a telephone, its cradle, and a speaker all in a box about the size of a very-portable typewriter. It simply makes it possible for a whole class of people to talk with other people on the phone and hear their responses projected loud and clear into the classroom.

This machine has two obvious advantages that make teaching a delight:

First, you can reach anybody in the world and talk with them. All you need is their willingness, the machine, and a creative administrator who can cover your less-than-modest phone bill. (Using the University WATTS line, we get by for \$15 an hour.)

Second, you can talk about any topic in the world, no matter how sensitive. This, I think, is a major reason why people are enthusiastic about the Coping with Divorce course. If an issue is critical to the divorce process, we can talk about it in a straight-forward manner.

For example, violence and divorce are closely linked. Estimates by professionals vary, but possibly thirty or forty percent of all divorce scenarios include physical altercations. Now people, of course, aren't very comfortable talking about this. And the thought of speaking in front of a class of 70 or more people can strike fear into the heart of even the most experienced performer when the topic is how you beat up your wife or how your husband beat you. The teleconference eliminates these problems.

As moderator of a teleconference dialogue, I typically ask the graduate students helping in the class and class members themselves to find people to talk with us. "The topic next week will be violence and divorce," I might say. "We need four or five battered spouses and battering spouses to talk with about the dynamics of family violence." The graduate students and the class always come through. By the next week we would have the telephone numbers of three or four or six people who had been contacted and had agreed to talk with us. They would remain anonymous to the class and to me.

One evening we spoke to parents whose adult children had divorced. We had three different couples on the phone, and I did not know who they were, nor did they know each other. By accident, we found out later, two couples were neighbors and old friends of each other. They spoke on the teleconference panel for an hour, and never realized each other's identities!

On occasion someone will recognize a person's voice on the phone, but this happens only rarely. And, we pledge panelists and class members to confidentiality, or our experiment in bringing the issues to life will be imperiled. The system has yet to backfire.



Some people are more open in small groups than others. A rare few never offer much more than name, rank, and serial number. We feel that is sad, for opening up can be quite helpful. But opening up is not mandatory to receiving a good grade in the class. And, of course, some problems are too deadly to get into without the help of trained and experienced professionals. The class discussions occasionally demonstrate this.

For example, the subject was child abuse and divorce one evening. A young woman was on the teleconference circuit. No one knew who she was. She talked for an hour and a half about how her father had abused the family when she was a child. One time he held the mother and the young daughter in the barn hostage for several hours. He trained a double-barreled shotgun on his family and threatened to kill them and himself. On another occasion the father ran off raving into the night. "He's down by the crick," the mother told the daughter, then about 7 years old. "If I go down to get him he'll kill me. You go get him. He won't kill you. He likes you." It was three a.m., and the young woman described what it felt like to go after a crazed father in the pitchblack night so vividly that the class sat riveted to their chairs.

A young man came up to me after class was over. He was shaking so uncontrollably that he could barely speak. He and I went for a walk in the night around the campus. We walked for 45 minutes before he finally calmed down a bit. He was so angry with his father for being "a tyrant" that he wanted to kill him. Hearing of the terrible fears that the young woman had experienced triggered this young man. I helped him find a good counselor in the University Counseling Center that night, and he began the very next day the long process of trying to work through his anger.

So, no, we certainly don't try to wade into problems that are far too great for our small groups to handle.

When we began teaching the course, it was assumed that only divorced or divorcing people would be interested in coming. We were very, very wrong. The first evening we met, a poll showed that 60 percent were not divorced. This was a real shock at the time. Should we throw the non-divorced people out? Will the divorced feel like they're in a fishbowl? Can we have honest discussions with so many non-divorced people?

We put these questions to the group. They discussed them at length, and voted anonymously and unanimously to stay together. The divorced didn't want to be segregated away from the rest of society, and the non-divorced all had legitimate, sincere reasons for being there.

A non-divorced person can learn a lot about marriage from divorced people. And single divorced people often show up for our marriage enrichment programs. "I want to learn what a good marriage looks like," a middle-aged divorced man once told me in explanation for why he wanted to be in a group of couples.

### Developing Curriculum

Since the students invest time and money in the Coping with Divorce class, they have a lot of say regarding what happens in class. The first class meeting will invariably be spent figuring out interest areas we wish to probe. I'll have a lot of ideas about what I think is worthwhile looking at. And class members will offer their ideas. These will be written on the blackboard. Then, after class, I'll take all the ideas and try to fit them into a logical, orderly sequence of topics.

Below is a list of interest areas that our class members have come up with over the years, and some quick suggestions on how best to approach them:

The Account. A good way to start a series on divorce is by talking about what happened and why. Many people come to class blaming the ex-spouse for everything from a bad marriage to inflation in Israel. A panel of more thoughtful divorced people, carefully picked for discussion in front of the total group, can go a long way toward underlining the complexities of the divorce process. It seems to be helpful to hear many views of what happened in a number of marriages — the wife's account, the husband's, the children, the relatives, friends.

My experience as a counselor, court investigator in child-custody disputes, and mediator has taught me that the causes of a divorce are usually elusive; one will never know for sure what happened or why. But divorced people need to sift through the rubble and at least try to learn something so that they can try to avoid these problems in the future.

Chemical dependency and divorce. Addictive behaviors figure heavily among the causes of divorce. Alcoholism is especially prevalent and worth a whole evening's discussion. Other drugs are also commonly involved. (The addiction of gambling shows up, too.) A good approach for this sensitive topic is a panel via teleconference. It's useful to get some spouses on the phone who have suffered through the alcoholism of their partner; and it is also very important to have the dependent one to speak for himself or herself.

Violence and divorce. This just can't be ignored. Panels work much better than studies and statistics. The discussion will be stunning.

The other woman, the other man. These people figure in many divorces. We once had a teleconference panel of five other women and men scattered across our state. They didn't know us and didn't know each other. The dialogue went for an hour and a half, and no one in the room appeared bored. The panelists learned a lot from each other in the discussion, also; at times it appeared like a group-therapy session for the panelists with an audience listening in.

The courts and divorce. It's good to know the nuts and bolts of the system, and the best way I know how is to invite lawyers, judges, court investigators, and families who have gone through the process.

Maternal custody, paternal custody, joint custody, and split custody. Our own research with 738 families in 47 states indicates that each option is viable. (2) The key is to fit the right approach to the right family. A panel of folks representing each option is very illuminating.

Children of divorce. This is also very sensitive, but essential to the class' understanding. We have had successful panels of children and their parents in person or on the phone. It's just not enough to wade through the studies; lecturing the class on what the researchers have found is helpful, but never enough. And we haven't seen any evidence that having the kids talk about the divorce in our class has hurt them; we've seen a number of occasions where it helped them tremendously.

Children don't cause divorce, nor do they have much power when it comes to preventing a divorce. But, they certainly are the unwitting victims in many divorce struggles. How to spare the children needless pain is a difficult and especially important question to deal with. My own experience as a court investigator and expert witness in custody fights has made me acutely and painfully aware of how terrible the battle can be if you're stuck in the middle as a child.

I come down strongly on the side of those favoring mediation of child custody disputes when possible. Taking the battle to court is hopelessly messy and inefficient. A \$3,000 to \$8,000 bill for such combat is nothing. I was once astounded to hear that a father had spent \$100,000 fighting for the kids.

I believe that lawyers are important as advocates of the rights of their clients. But if my own daughter came up to me and said she wanted a divorce, I'd quickly write her a check for \$1,000 and say, "Spend this on a mediator. If that doesn't work, then get yourself a good lawyer."

Parents of adult divorcing children. What do middle-aged parents feel when their adult child divorces? A good panel can get a lot of these feelings out into the open.

The emotions of divorce: Loneliness, anger, depression, elation. One panelist told us she was so depressed that she thought of suicide. "But I spent all my time in bed. I was so depressed I couldn't even get out of bed to get the pills and kill myself." The class members can have images literally seared on their brain by divorced people who wish to help others by talking about their experiences.

Feeling okay as a single. Most people adjust to singlehood relatively well, and there are a lot of advantages to it. A panel of happily functioning singles is a good role model for the group.



Money and divorce. In my own experience as an educator and counselor, I see two key issues in coping with divorce: managing one's emotional life successfully, and simultaneously managing one's finances. There seem to be more problems than answers in this area. Many divorced people will open up if asked to discuss money and how they manage. Many women who were full-time homemakers make a transition of going to work or going back to school. Managing a job, school, children and a household often appears overwhelming at first.

The term "feminization of poverty" is in vogue today, and one of the main reasons is the high divorce rate. Much of the increase in the number of poor women can be attributed to the financial catastrophe many suffer after a divorce. And, for many men divorce is also a difficult blow: "I lost my house, my car, my kids, my wife. I don't have anything left," is the very common story.

The family economics professionals, with their special expertise in financial management, thus can be especially important to those experiencing divorce.

Community services for the divorced. Private counselors, child guidance clinics, community mental health, Cooperative Extension, family service associations, Parents Without Partners, church support groups... There is a long list of community services and good people staffing them on a professional and volunteer basis.

How to find a new partner. Where does one look? Joining clubs and groups, professional computer dating services, using the personal column in the newspaper, etc.

Dating and sexuality. What it feels like to be 18 again.

Remarriage and stepparenting. There's a growing body of good research in this area now, and a number of good support groups around the country to tap for speakers and ideas. Remarriage, of course, is not the goal of all divorced persons, nor should it be. Rather, it is only one option.

These are just a few of the topics we have discussed. Each group selects its own course agenda. That makes the course a lot of fun, because it's different every time.

#### Evaluating the Students, Evaluating the Course

Graduate students take care of most grading. They don't receive money for their services, but get three university credits (which they pay for), and individual attention from the professor. The graduate students meet with us for lunch once a week to talk about how class is going and what to do next. These are informal but very valuable meetings.



To receive two credits for the eight-week course, students must attend at least seven sessions and write a one-page reaction paper after each of the sessions on how they felt about the experience. Buttering-up is not allowed; honesty, rather, is encouraged. Those who offer constructive criticism are seen as being helpful in the process of developing a good course. Students also must read two books or several articles and write two- or three-page papers on each — what ideas were personally useful to them, and what ideas didn't make a whole lot of sense to them. The emphasis always is on utility. How can an idea be successfully applied to life?

These papers are graded, but the grades are generally quite high because the emphasis is on honestly communicating feelings, rather than on library research.

The effectiveness of the course is evaluated a number of ways. Each week the graduate students read the small group members' reaction papers and report back to the professor how things are going. The graduate students also offer their ideas on what could be done better and how. An over-all evaluation of the course is written in the final session at the end of eight weeks. Using this on-going evaluation system, we generate a good deal of information: More than 500 papers of individual evaluation in a typical course. We like to think we're very well attuned to the needs of the group. Their final measure of us concurs with this judgment. Over the years 60 to 70 percent of the students have rated the Coping with Divorce course "Superior" on a five-point scale. Twenty-five to thirty percent have rated the course "Good," which is the second-highest point on the scale we use. The remaining five percent have rated the course "Average." We have never gotten a rating below "Average."

#### Generalizing To Other Educational Programs

Our graduate students trained in this approach have entered the professional community and have been successful applying it to community mental health programs, churches, private counseling agencies, and in Cooperative Extension. I won't go into detail on this, because I think a professional in a particular agency will readily see what facets of our model easily adapt to another framework.

I'm especially interested in seeing the approach applied in churches and in Cooperative Extension. A good Coping with Divorce program can be a preventive program. A lot of problems can be alleviated before they become major ones that need the services of our overworked and expensive counseling agencies and private practitioners. Many divorced people can afford to pay two or three dollars an evening to come to a Coping with Divorce series in a church or lecture hall, but going to a counselor for \$35 to \$50 per hour is another matter.

I'm certainly not trying to put counselors out of business, for I do a modest amount of private counseling myself. But there simply are a lot of divorced people who need a little shot in the arm, and not a major overhaul (to mix metaphors a bit).

Volunteer help is essential for getting a program started, and for keeping it going. I know of no agencies that could do this type of program any other way. And, volunteers do an excellent job. I'd look for someone who has some battle scars; someone who has gone through a divorce, experienced the divorce of his or her parents, or is in the midst of a good, happy marriage. A sensitive married person can understand divorce just as well as a divorced person, for as one cynic noted, "The major cause of divorce is marriage."

The volunteers gain a good deal from the experience: Foremost is the opportunity to be involved in a program that can really make a difference in their own life, and in the lives of others.

#### Parting Remark

Getting involved in such a program holds out the possibility that the lives of others will be enriched. Most certainly, the life of the person developing such a program will be enriched. Frustrations will come, of course. But the rewards of seeing ourselves and others involved in the process of marriage and divorce — both the fear and the joy of involvement in a great adventure — are too great to pass up.

#### Resources

There are good films and videotapes out there on divorce, but they're hard to get your hands on. And, most human and family service organizations don't have enough money to rent them.

Good things to read also abound, and are cheaper to come by. I especially like the books listed below.

Bernard, J. Remarriage: A Study of Marriage. New York: Dryden, 1956. A classic study by one of the nation's best researchers and writers.

Bohannon, P. (ed.). Divorce and After. Garden City, New York: Doubleday, 1970. Excellent articles by a wide range of authors.

Eisler, D. Dissolution: No-Fault Divorce, Marriage, and the Future of Women. New York: McGraw-Hill, 1977. A systematic analysis of marriage and divorce laws.

Goode, W.L. After Divorce. New York: Free Press, 1956. Still stands as one of the best studies of divorce.

Hunt, M. & B. Hunt. The Divorce Experience. New York: McGraw-Hill, 1977. A fine 1970s follow-up to their earlier study of the divorced, The World of the Formerly Married, published in the 1960s.

Levinger, G & O.C. Moles (eds.). Divorce and Separation: Context, Causes and Consequences. New York: Basic Books, 1979. An excellent book of readings; the list of authorities with articles in the book is impressive, and the topics are comprehensive.

Roosevelt, R & J. Lofas. Living in Step: A Remarriage Manual for Parents and Children. New York: McGraw-Hill, 1976. A nuts-and-bolts primer for stepfamilies.

Wallerstein, J.A. & J.B. Kelly. Surviving the Breakup: How Children and Parents Cope with Divorce. Wallerstein and Kelly have spent as much time as anyone working with children's problems in divorce.

Weiss, R. Marital Separation. New York: Basic Books, 1975. A sensitive study of the challenges people face.

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### Notes

1. Paul Glick and Arthur Norton estimated at the end of the 1970s that 40 percent of all marriages entered into by the current generation would end in divorce. See "Marrying, Divorcing, and Living Together in the U.S. Today," Population Bulletin 32 (Washington, D.C.: Population Reference Bureau, 1979). The marriage-to-divorce ratio has held at roughly two-to-one into the 1980s, according to the National Center for Health Statistics, and we would expect that Glick and Norton's 40 percent figure will be revised upwardly. (See National Center for Health Statistics Monthly Vital Statistics Reports, Vol. 30, No. 13, December 20, 1982; Vol. 32, No. 3, Supplement, June 27, 1983; and Vol. 32, No. 5, Supplement, August 18, 1983. Hyattsville, Md.: U.S. Public Health Service.)

2. We're currently working on a book-length manuscript based on our data. For anyone interested, we can send a short synopsis of the research.



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### Interdependence of Families and Nations

The trend for the future affecting American families includes an increasing interdependence of all nations not only in business and agriculture but also in educational and scientific programs. American families are very much aware of the number of goods imported into the U.S.A., especially foreign-made automobiles and electronic equipment. Some families are aware of the influx of refugees and foreign-born citizens into the U.S.A. The number of foreign nationals (Harris and Moran, 1979) who came to the United States in 1979 exceeded 18 million. This trend continues today. Interaction and communication among persons of different cultural backgrounds has been a necessary part of the way of life since our nation's birth.

In order to be effective in conducting cooperative extension educational programs we must broaden our view beyond the state or nation, recognize the increasing interdependence of nations and become prepared to operate more effectively within international parameters. Leaders in the field have already acknowledged this issue. The publication entitled "Extension in the '80s" identifies international concerns as one of the major program goals necessary to carry out the mission of cooperative extension in the 1980s. Two important international roles for Extension are suggested:

1. Promotion of international understanding with the United States.
2. Provision of Extension Training Programs for foreign leaders. The Cooperative Extension concept is of great value to less developed nations of the world.

### Cross-cultural awareness

Cross-cultural awareness can increase the effectiveness of Extension Service employees serving outside the United States, as well as those working with minorities within the United States. Cultural backgrounds influence people's perceptions, communication, behavior and decision-making, thus, it is essential to understand those cultures with whom we work. Educators must gain more insight and sophistication in understanding and motivating people from other cultural backgrounds.

As we carry out our Extension education programs we must be prepared to do the best we can in providing programs for people from all cultural back-

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grounds. This means that staff development and in-service training programs must assess the needs of Extension Agents as well as Specialists in developing and presenting educational programs. Lacking knowledge in cross-cultural understanding and cultural self-awareness may result in misunderstandings or mistakes in planning and implementing educational programs for families from different cultures.

Knowledge about cultures, both general and specific, provides insights into the learned behaviors of groups. It is essential for the educator to gain awareness of what makes a people unique - the values and beliefs, attitudes and concepts, hierarchies and roles, time and space relationships, and verbal and nonverbal communication processes.

Whether we are concerned with intercultural training, education or development we need to learn about culture (Nadler, 1970) and cross-cultural communication. This is especially true if we are to work with minorities within our society. Culture is fundamentally a group problem-solving tool for daily coping in a particular environment. The process enables one to grow in self-actualization, to create a distinctive world around oneself and to control one's own destiny. We must recognize that persons of other cultural backgrounds have different goals, values, customs, thought patterns, from our own. We must understand these differences when planning educational programs.

The United States is a multicultural society. In many ways it is a nation of minorities. There is a mainstream culture shared by the "average" American. Within our society we not only have the mainstream macroculture but also have many minority microcultures. We make certain mainstream cultural assumptions and have definite value systems. The average American approaches everyday activities with concern about progress and accomplishments. They are optimistic and strive to do as much as possible. The pace of life is fast. Goals in planning stress procedures, techniques and means for accomplishment. The dominate mode of activity in mainstream American society is "doing". Some cultures, however, believe that life follows a preordained course and human action is determined by the will of God. Other cultures may believe that people are intended to adjust to the physical environment rather than alter it. The mainstream American believes that we must work hard to accomplish our objectives for success, whereas other cultures may believe that hard work is not the only prerequisite for success. Wisdom, luck and time are also required. In the American culture, we also believe that time is money which can be saved or wasted. Other cultures may believe that schedules are important but only in relation to other priorities. These are only a few of the differences between cultures (Harris and Moran, 1979). Extension personnel working in developing countries can relate interesting stories as examples of these differences.

### Families in Cultural Shock

It is understandable that families coming to the United States from other countries go through cultural shock. The term "culture shock" came into use

to describe the reaction people undergo shortly after their arrival in a new and strange culture. Culture shock has been experienced by millions of people throughout history. It happens to tourists, professional and business people as well as immigrants and refugees.

No particular culture is inherently better or worse than another - just different and unique. Every culture provides a sense of identity which influences the families' behavior and life space. When a family member moves to another country it creates a transitional experience beyond the member's own culture which may heighten this sense of self, or deeply threaten their ego. A family member moving into a second culture can benefit or suffer or experience both through this experience. This transition requires a change from monocultural to a multicultural reference. It is necessary for the family member to deal with their self-concept. The crisis of the change creates anxiety within the family. Opportunities must be provided for the family to make intercultural contacts so that family members may enter into interpersonal relationships and to perceive and deal with the differences. The family must deal with life situations which they have never dealt with before and gain a sense of accomplishment through these experiences. Betty Eyler and Martha Copenhaver are conducting one of the educational programs offered to refugees in Virginia. Many of these families are going through cultural shock.

#### Arlington Southeast Asian Refugee Program

The Refugee Program in Arlington is one example of a very creative and successful program in Virginia which focuses on education for other cultural families. This Southeast Asian Food and Nutrition Program began as a pilot program in July 1982 and was partially funded by a grant from the Washington Forrest Foundation. It involved 50 low-income, newly arrived Indo-Chinese families who attended seven (7) one hour sessions taught by two Cooperative Extension EFNEP and Urban Technicians. The participating families were identified through the refugee offices and social services. The program is designed to teach proper nutrition and food storage and to help the refugees adjust to American foods, supermarkets, and kitchen appliances. According to the 1980 census, 6,631 Asians and Pacific Islanders live in Arlington County. (Many more arrived after the census was taken.) A goal of reaching 25 per cent of these refugees was set - at least one new family per week for each Technician.

In March 1983, a director and two foreign-born technicians were hired for 20 hours a week to begin the program funded by 1980 Budget of Virginia State. The technicians received extensive nutrition training and began teaching in April. Teaching is done in the native language since the majority of the refugees do not speak English. Techniques include filmstrips, demonstrations, tasting parties, and tours to the supermarket. Nutrition materials have been collected, translated and distributed in the classes.



Because there is often a transportation and/or babysitting problem, the families are taught in their homes. Here they feel more comfortable and all family members can participate. The technicians often become aware of other problems and can make referrals to proper agencies for help. As a result of this program in the past year, 115 families have received instruction in a set of seven lessons, 20 families are in the midst of the lessons, and 15 are enrolled and on the waiting list. Attitudes regarding "the proper food - good health" connection are changing. Emphasis is given to pre-natal, infant, and maternal nutrition. The refugees are learning to use low-cost protein substitutes, American fruits and vegetables, to collect coupons, to read and understand labels, and to store food safely. They are learning to use appliances and to prevent the spread of rodents and other pests in their housing, thereby improving their habitat. Evaluation of the program is done through "food recalls", attendance records, requests for inclusion in the program, and technician's evaluation. The County has seen the benefits of the program and has provided additional funding for August through December 1983 in order that a highly concentrated area of refugees be targeted to receive these classes. Many more hundreds of refugees need to be reached and the learning needs to be reinforced by follow-up group experiences on various extension topics, especially energy, birth control, money management and caring for housing.

#### Virginia Cooperative Extension

In 1982 a planning unit on International Extension was established by the Extension Division at Virginia Tech, as an outgrowth of a recognition of the increasing interdependence of all nations. The objectives of this unit focussed on educational programs for other culture families both in Virginia and in developing countries. Included within those programs in Virginia is our Southeast Asian Program in Arlington under the leadership of Betty Eyler and implemented by Martha Copenhaver. We also have other local, state and international projects which address the needs of families from other cultures.

One example of our international effort is the Sahel Regional Financial Management Project which is implemented through a cooperative agreement with the Technical Assistance Division of the Office of International Cooperation and Development within USDA. The funds for this Project are provided by USAID. Virginia Tech's involvement in this Project serves to facilitate the cooperative effort of USDA and demonstrate throughout West Africa the Cooperative Extension System's concept of education. The emphasis is on financial management training utilizing an action-training/learn-by-doing methodology. This program not only enhances a closer working relationship with USDA/OICD but also strengthens the University's capacity to conduct international programs.

The efforts of the Virginia Cooperative Extension Service in providing educational programs for individuals from other cultural backgrounds in local, state and international projects contribute to the goals of the Extension



Services as stated in the publication Challenges and Change ... A Blueprint for the Future (Extension Service, USDA, 1983). The goals are:

1. To cooperate with agencies and institutions of federal, state and local government and the private sector in developing and conducting educational programs.
2. To strengthen the family and home through the attainment of knowledge, human skills, and technology needed to create a satisfying quality of life within available resources.

We must work together at the local, state, national and international levels in order to meet the challenge of the increasing interdependence of nations. Families are affected by this trend. As our nation must recognize the implications economically, we as educators must also deal with the effect it has on the quality of life for families. Much more needs to be done in order to prepare Extension staff to provide educational programs for other cultural families. Many of our staff members lack cross-cultural awareness and skills.

### Conclusions

The United States is a multicultural society. In many ways it is a nation of minorities. Within our society we not only have the mainstream macroculture, but also have many minority microcultures. The realities of a more pluralistic society and the interdependence of nations for food and fiber reinforces the need for cultural awareness training.

Cultural awareness is necessary for educators in:

1. Developing knowledge, attitudes and skills necessary in planning, implementing and evaluating educational programs for refugee families as well as families from other microcultures.
2. Developing a better understanding of how to effectively work with representatives of microcultures within the community.
3. Providing technical and program assistance for developing nations through international projects.
4. Understanding cultural influences on human behavior.
5. Improving intercultural communications.

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(This report was written by Sandra Shaber, Chase Econometrics)

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After several years of very sluggish growth in consumer demand, the period ahead should bring some welcome changes. The combination of economic recovery, personal income tax cuts, and moderate inflation is providing the most significant boost to real income in years. Productivity—a crucial element in the growth of income and standards of living—has improved markedly from the dismal performance of the late 1970s and should continue to rise more rapidly in the years ahead. The prospects are good that we will be able to avoid the spiraling prices for energy and food that have had so damaging an effect on the purchasing power of middle and lower income consumers. In most respects demographic changes will reinforce the economic trends. Slower growth in the adult population and a shift in age structure as the baby boom generation ages will bolster income per capita and per household, favoring growth in demand for more discretionary and income-sensitive goods and services.

#### HOUSEHOLD BUDGETS THROUGH THE MID-1980s

Consumer spending during the next several years will be dominated by recovery from the recent recession and preceding years of weak economic activity. The most dramatic change, already underway, is that consumers will spend an increasing share of their budgets on autos, appliances, furniture, and other durable goods (see Figure 1).

1. As Figures 2 to 5 indicate, inflation-adjusted expenditures per household on many key durable goods remain below peaks reached three and even four years ago. The result is a substantial backlog in demand which will require several years to satisfy. A rebound in sales of durable goods is typical during an economic recovery since these are the types of purchases which are most readily sacrificed or postponed during recessions. However, the rebound effect in this recovery should be especially strong because of the very long period of poor economic conditions and the persistence of extremely high consumer finance rates.

2. Strong underlying demand for housing, as witnessed by the rapid surge in housing starts and home sales as soon as mortgage rates began to ease, is providing a major boost to sales of housing-related goods. Demand for appliances and furniture will continue to expand in the next several years so long as significant increases in mortgage rates and home prices can be avoided.

3. The demographic trends are favorable, especially since the baby boom generation is swelling the number of consumers in the prime auto purchase and household formation years (see Figure 6). A large fraction of these consumers are dual-earner couples with above-average incomes, another plus for demand.

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Figure 1\*  
Consumer spending share:  
durables

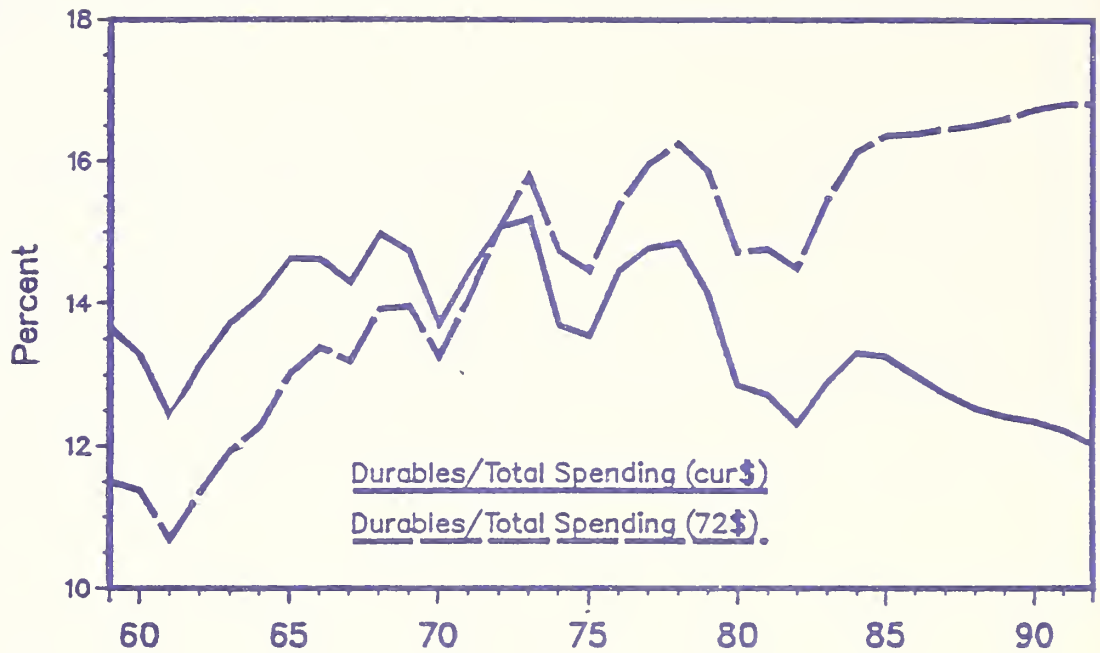
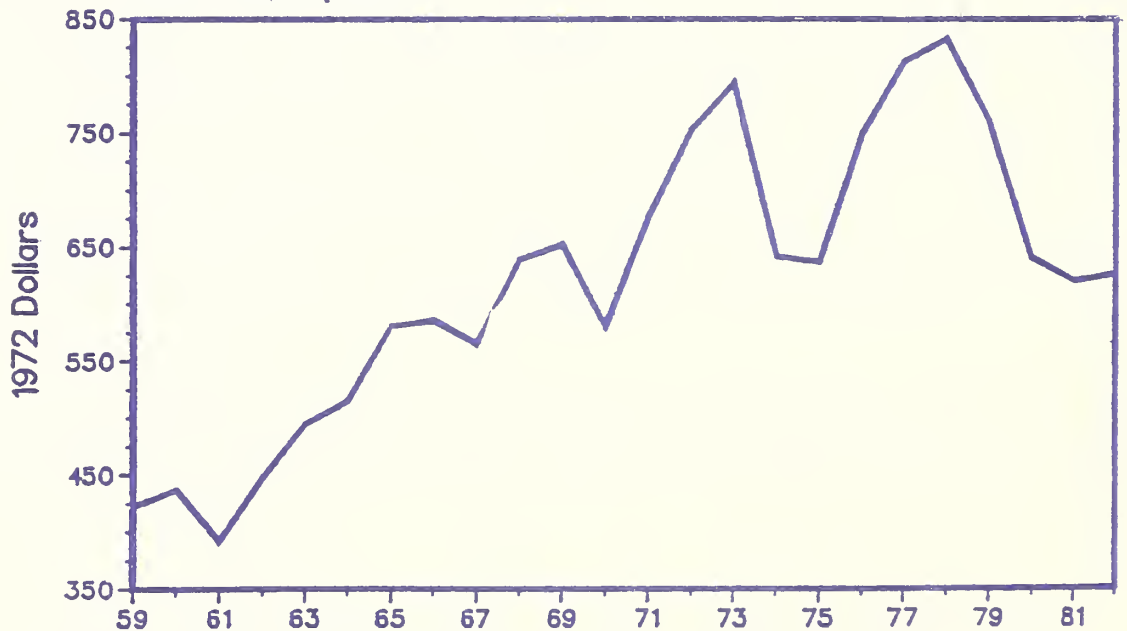


Figure 2\*  
Consumer spending per household:  
autos and parts



\*Figures are based on the Moderate Growth Scenario.



Figure 3\*  
Consumer spending per household:  
furniture

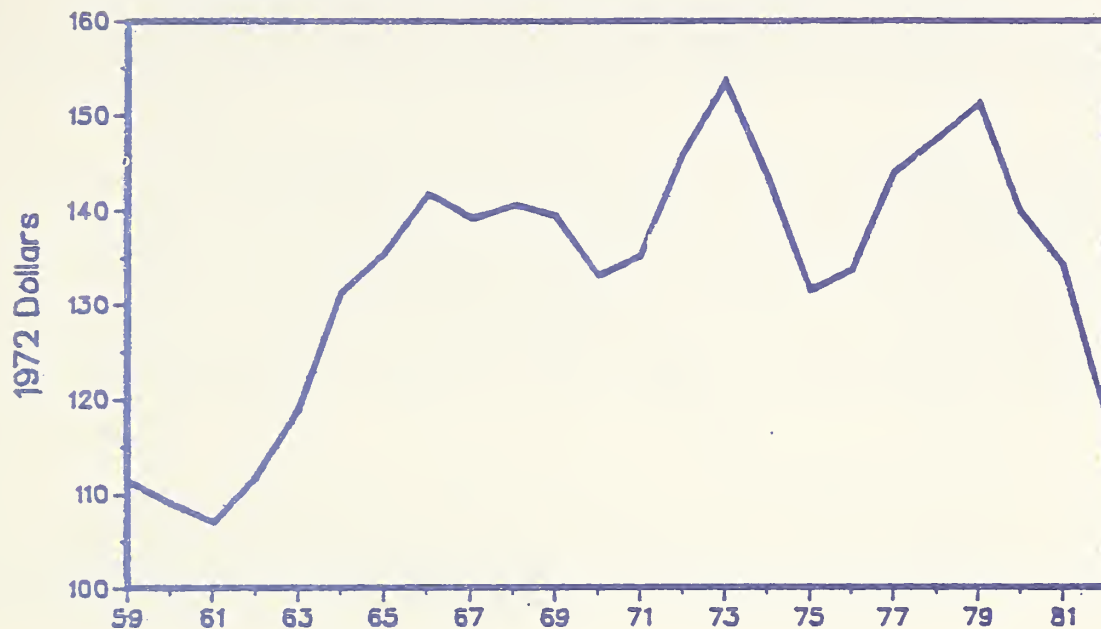
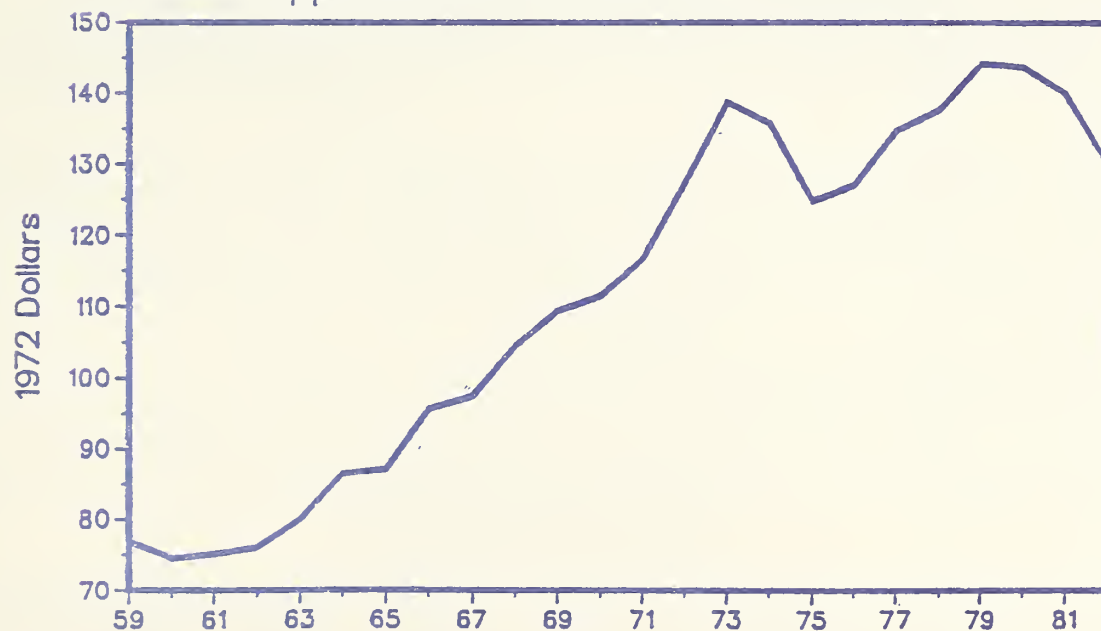


Figure 4\*  
Consumer spending per household:  
kitchen appliances



\*Figures are based on the Moderate Growth Scenario.

Figure 5\*

Consumer spending per household:  
wheel goods & sports equipment

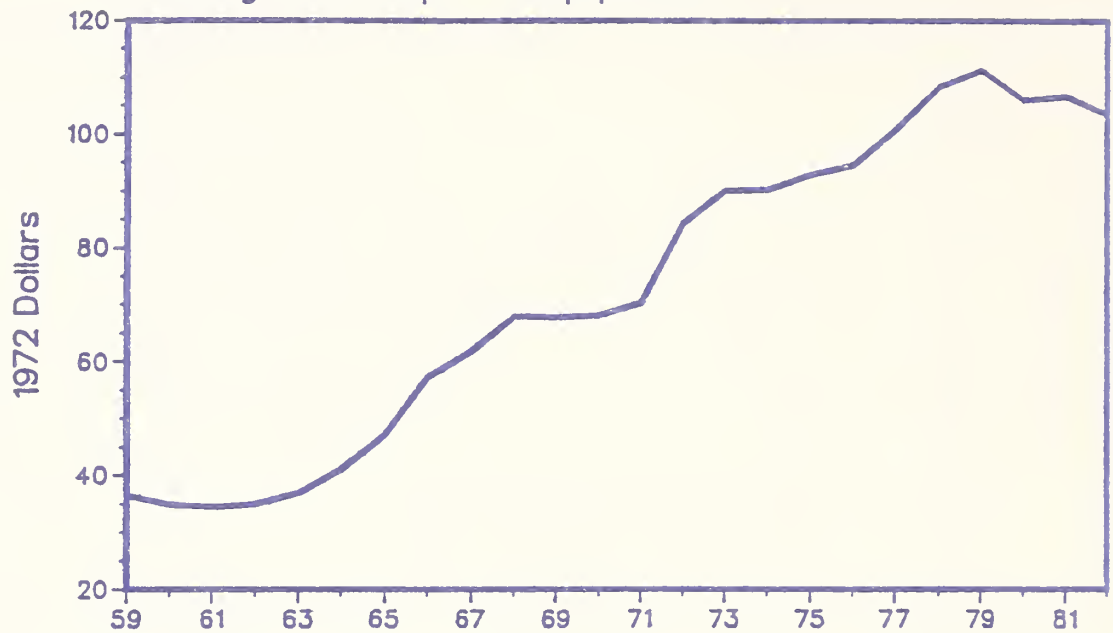
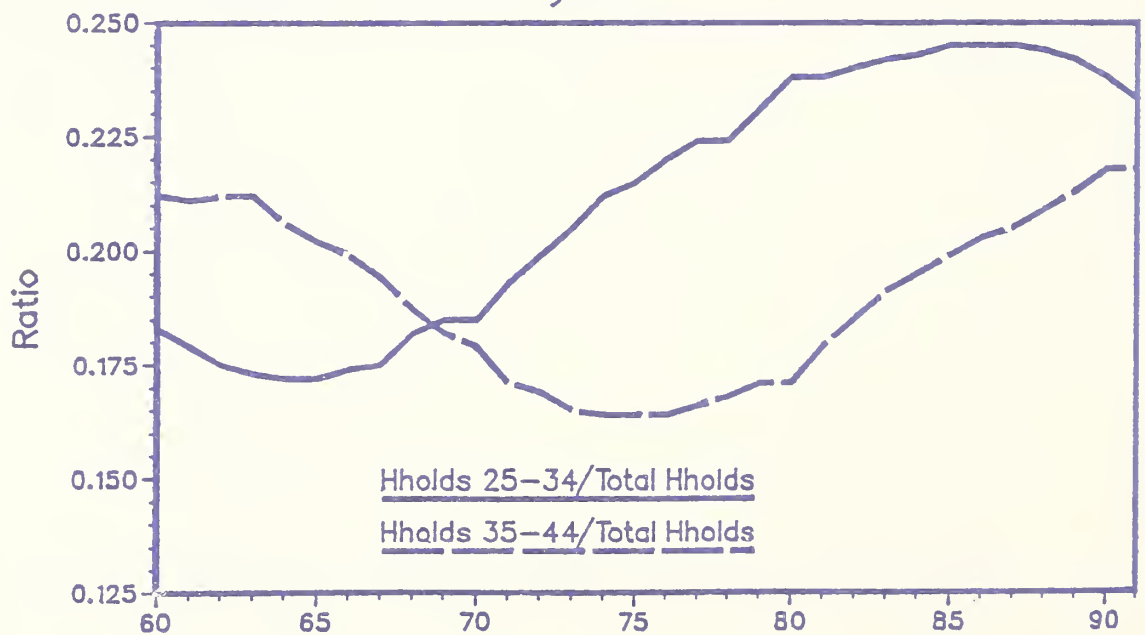


Figure 6\*

Consumers in the prime  
household-formation years



\*Figures are based on the Moderate Growth Scenario.

4. Slow income gains and high interest rates have led to a major retrenchment in consumer credit purchases since 1979 (see **Figure 7**). Even with stepped-up credit demand recently, the ratio of installment debt to income remains modest and consumers generally are in a good position to finance major purchases.

5. Consumer confidence has soared to levels not seen since the early 1970s, with many people reporting that interest rates and other economic conditions favor buying homes, autos, and other durable goods (see **Figure 8**).

Demand for durables during this period could well turn out to involve some trade-offs, especially between autos and housing-related durables. The key element is likely to be the trend in home prices and the cost and availability of mortgages. Should prices accelerate once again, many consumers will be priced out of the market. Slower growth in demand for housing may then encourage more auto purchases as many families decide to continue paying rent or remain in their existing homes. Similarly, if the housing market recovers more rapidly than expected—either because home prices remain relatively stable or because mortgage rates fall more rapidly—higher home payments and purchases of appliances and furniture may depress demand for autos and other types of durables, including electronics.

Spending for nondurable goods, particularly food at home, is likely to decline as a share of consumer budgets in the years ahead as moderate prices allow consumers to buy more discretionary items (see **Figure 9**). However, some types of nondurable goods will benefit from the increase in discretionary income, including such items as food away from home, clothing, sports supplies, and toys.

Real demand for services is likely to remain fairly stable in the next several years as consumers rebuild their stocks of durable goods (see **Figure 10**). However, as a share of current dollar spending, the trend can be expected to continue upward since prices are likely to continue to rise more rapidly for services than for goods. Both because of high relative prices and because demand is sensitive to income growth, spending for services such as medical care and recreation should expand fairly rapidly. Americans are likely to continue to travel abroad in the next year or so as exchange rates remain favorable; other travel-associated expenditures should also expand given only moderate price increases for gasoline and transportation.

As employment in many of the hard-hit manufacturing industries begins to rise again, blue-collar unemployment rates will begin to recede. More job growth and rising real wages will go far toward bolstering the income of groups hardest hit by the recession—the young, one-earner families, and many lower income households. Stronger income gains for these consumers, together with more moderate price increases for food and fuels, should lead to stronger growth in the mid-price segment of many markets.

The rebound expected for some key categories of spending is summarized in **Table 1**. Most are durable goods, which will benefit from the combination of lower interest rates, a stronger housing market, faster income growth, and relatively modest price increases. But all tend to be discretionary purchases which should experience above-average growth rates through much of the decade ahead.

## LONGER-TERM SPENDING PATTERNS

As the recovery process and the associated rebound in demand for durables are completed in the mid-1980s, some of the longer-term trends in spending should re-

Figure 7\*  
Consumer installment debt

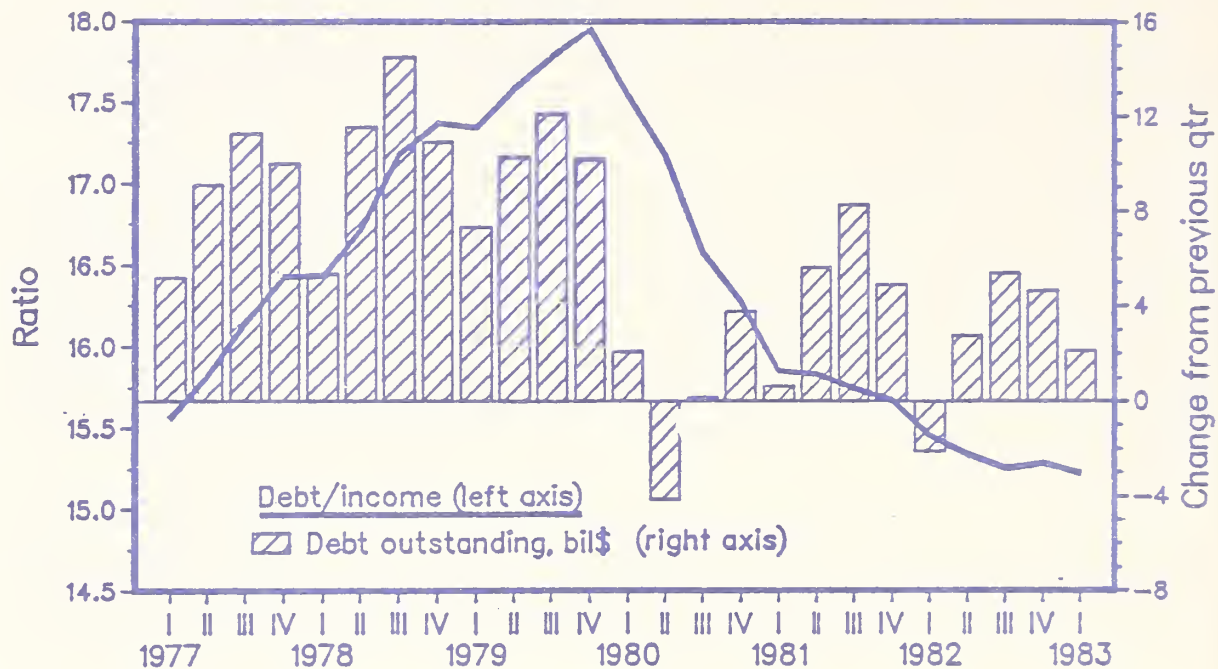
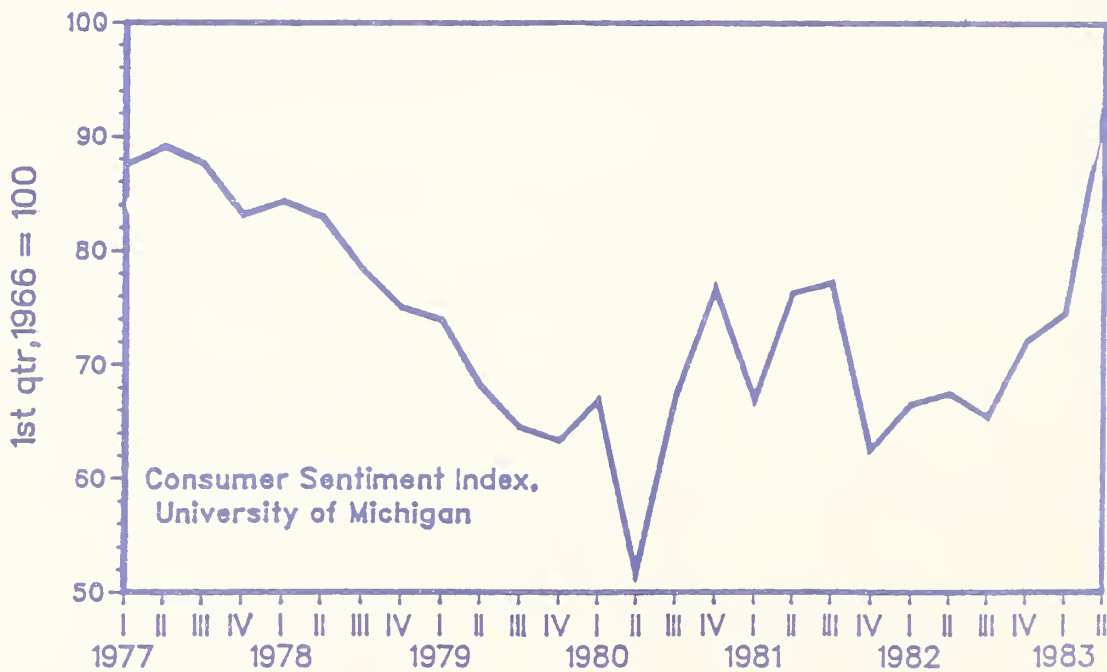


Figure 8\*  
Consumer confidence



\*Figures are based on the Moderate Growth Scenario.



Figure 9\*  
Consumer spending share:  
nondurables

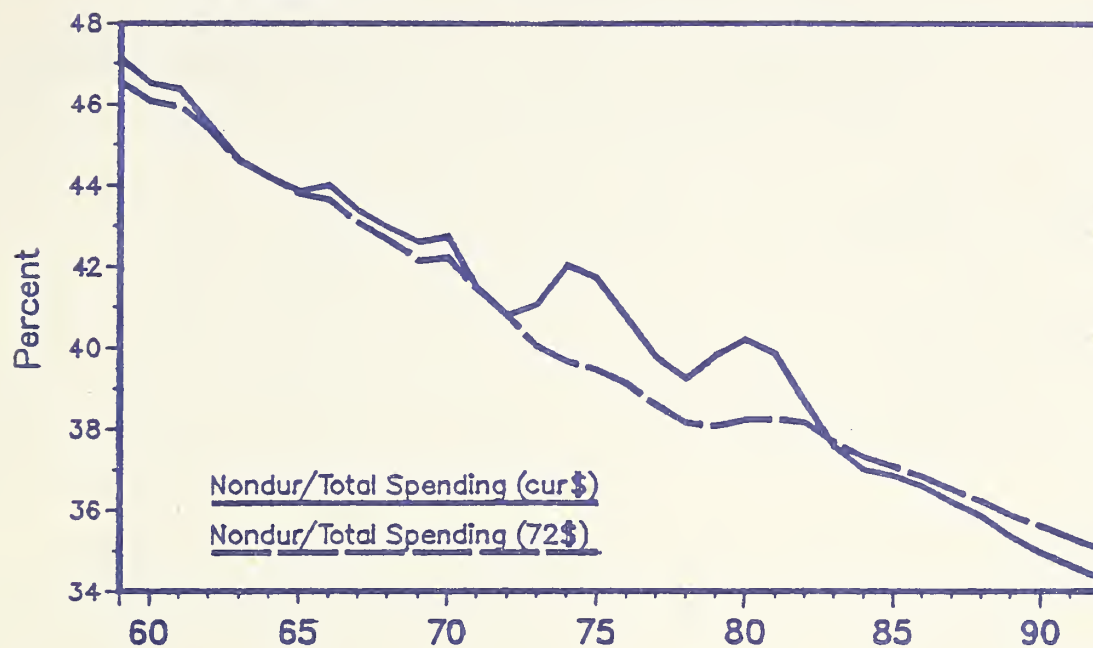
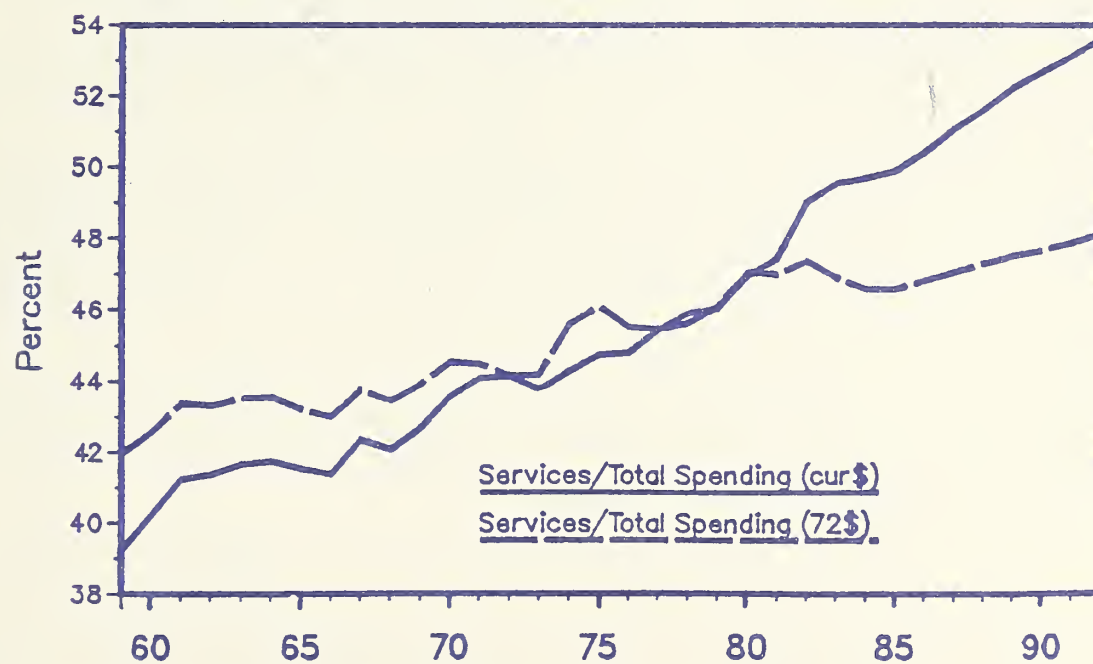


Figure 10\*  
Consumer spending share:  
services



\*Figures are based on the Moderate Growth Scenario.

Table 1  
Recovery from the Stagflation of 1979-1982  
Consumption Expenditures, 1972 Dollars  
Moderate Growth Scenario

	Percentage Change	
	1979-1982	1982-1985
Motor vehicles*	-19.0	45.1
Furniture and bedding	-12.8	19.0
Floor coverings	-16.0	20.9
Kitchen appliances	-1.7	15.6
Medical appliances	-10.3	15.4
Wheel goods, sporting equipment	-4.3	18.5
Boats	-41.0	20.2
Pleasure aircraft	-40.9	20.1
Lodging	-8.1	13.9
Auto repair	-7.5	11.0
Airline travel	-29.4	10.5

\*Change from peak reached in 1978

appear. Real demand for durables is likely to level off; lower prices relative to other goods and services will allow the share of nominal spending for durables to decline. In both real and nominal terms, the spending share for nondurable goods will continue to fall. As noted earlier, real demand for services is likely to remain stable as a share of total spending, although high relative prices will lead to a rising share in nominal terms.

The demographic trends of the decade ahead will reinforce many of the long-term economic trends. Growth in the size of the population 25 to 34 years old will peak in the mid-1980s, dampening further growth in demand for some durable goods. Slower growth in the adult population and the addition of fewer households compared to the 1970s will also limit demand for housing-related durable goods. Slower population growth also implies only sluggish expansion in demand for goods such as food, which respond primarily to numbers of people. As we have pointed out, several demographic factors will bolster household income. These include the aging of the baby boom and the associated increase in that generation's relative income, the growing number of two-income families, and the continuing trend toward small households and families. Stronger income per household and per household member will combine with the growth in aggregate income to bolster demand for discretionary goods and services.

Both the economic and demographic trends point to relatively strong growth in labor-saving and leisure-enhancing goods and services. Thus the expanding markets of the 1980s include appliances which incorporate technological advances and provide convenience or entertainment, electronics and services which promise personal enrichment and improved skills, goods and services related to sports and physical fitness,

and education and travel. Examples of these trends include the mass marketing of video recorders, the spread of cable television, recent experiments with electronic home-shopping, and the development of digital recording and playback.

Another strong market in the years ahead is the category including wheel goods, sports equipment, and "durable" toys. In the past decade growing interest in sports and physical fitness—much of this associated with the baby boom generation—together with the introduction of electronic games led to rapid growth in demand. Even with some market saturation of sports equipment and volatility of tastes, these products will continue to expand on the strength of real income growth, relatively modest price increases, and the large number of people in their middle years who are likely to retain at least some of their earlier interest in physical fitness. Oddly perhaps, in view of the low probability of any significant increase in the birth rate, the prospects are bright for sales of toys. The baby boom generation is likely to continue to have small families, but the sheer size of the generation is resulting in a large number of births. The number of children under 15, which declined at an annual rate of nearly 1 percent during the past decade, is expected to increase at nearly that rate during the decade ahead. It also appears quite likely that young families with more income will spend relatively large amounts on each child, offsetting the effects of fewer children per family.

As noted, as real disposable income increases more rapidly the share of household budgets spent for most types of nondurables will continue to decline. Slower population growth will be another limiting factor, especially in the case of food and other necessities. However, there are several important qualifications to this general trend. One is that continuing migration implies that some geographic areas—especially the Sunbelt and less urbanized areas—will achieve above average growth in demand for nondurables. Second, demand will be relatively strong for more discretionary items, even in such markets as food. Finally, demographic changes—including the maturing population and the greater affluence of two-income families—will bolster demand for products which are marketed to appeal to sophistication, status, or convenience.

By the mid-1980s, with the rebound in demand for durables largely exhausted, the long-term shift toward services will pick up speed. Several types of services look especially promising. Telephone and telegraph services are likely to benefit from new products and new forms of data transmission. Growth in real spending for medical care will continue to outpace expenditures for services in general, both because of the income sensitivity of medical care and above-average price increases. The expansion of cable television, movie sales to television, and casino gambling will continue to boost the recreation category. Even growth in auto repairs should be fairly brisk as older consumers keep cars longer and face an increasingly complex machine.

The central theme in this scenario for the 1980s is that despite only modest improvement in economic growth—the economy is not likely to return to the growth rates of the 1960s—the coincidence of less inflation, improved productivity gains, and demographic changes will strengthen household income. The result will be more rapid expansion in many areas of consumer spending, especially more discretionary goods and services. We have summed up many of these changes in Table 2 which shows the growth rates in real expenditures in markets expected to be the relatively strongest and weakest in the decade ahead.

Table 2  
The Faster and Slower Growth Markets of the 1980s  
Consumption Expenditures, 1972 Dollars  
Moderate Growth Scenario

	Growth Rate (%)	
	1972-1982	1982-1992
<u>Faster Growth</u>		
All consumer goods and services	2.8	3.3
Motor vehicles	0.2	5.7
Floor coverings	3.0	4.7
Audio and video electronics	7.9	5.1
Wheel goods, sport equipment, durable toys	4.1	5.2
Boats	-5.0	5.6
Toys, sport supplies	4.6	4.5
Lodging	2.3	4.7
Airline travel	1.4	4.5
Private hospitals	5.4	4.1
Telephone and telegraph	6.6	4.5
<u>Slower Growth</u>		
Food at home	1.7	2.0
Alcohol	2.0	2.2
Tobacco	1.1	1.7
Toilet articles	0.8	2.5
Men's clothing	3.0	2.0
Footwear	3.6	2.3
Cleaning and paper products	-0.7	2.2
Stationery	1.9	1.7
Magazines, newspapers	-1.3	1.5
Railroads	-0.1	2.3



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Recovery from the recession of 1981-82 has been the most important economic development affecting families in 1983. The economy began a sharp upturn during the first half of the year, with real Gross National Product (GNP) increasing at a near record 9.7 percent annual rate in the spring. Estimates show real GNP grew at a 7.7 percent annual rate in the third quarter.<sup>1</sup> Although the pace of recovery has moderated somewhat over the past several months, most indicators suggest that this year and 1984 will be characterized by economic expansion. Overall, real GNP is expected to show a 6.0 percent increase in 1983 and about a 4.5 percent increase in 1984, reflecting both increased economic activity and reduced inflation. As the recovery progresses, families should benefit from improved employment opportunities and relatively stable prices.

The economic recovery and other trends, such as deregulation of the banking industry, changes in Federal income tax laws, and proposed revisions in State property laws, are creating a new environment for family financial decisionmaking. Economic uncertainty may be giving way to growing complexity as the major problem facing families as they manage their resources. This paper reviews the economic conditions and trends affecting both the income and expenditure sides of the family ledger, as well as indicators of the ability of families to balance the two. Family financial management issues are examined in light of current economic conditions and the outlook for the future.

#### Income

This year may be the first since 1979 in which there is an increase in median family income adjusted for increases in consumer prices. Although household income data for 1983 will not be available until the March 1984 Current Population Survey (CPS), the personal income component of the National Income and Product Accounts (NIPA), an aggregate measure of income available to individuals and families, showed a 5.9 percent increase (about 3.0 percent adjusting for inflation) between the second quarters of 1982 and 1983 and is continuing to rise at an increasing rate.<sup>2</sup> This general rise in personal

<sup>1</sup> Estimates of GNP are published monthly in the Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis.

<sup>2</sup> Income data from the CPS and the NIPA are not directly comparable. Only limited trend information on family income can be derived from the NIPA. See "Interpreting statistical data in family economics," by Colien Hefferan, et. al., Family Economics Review 1983(1):21-26.

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income is unlikely to benefit all families equally, however. In 1982, for example, the decline in real median income was greater among married couple families, black families, families of Spanish origin, and families living in the West than among other types of families (see table). In the same year, farm family income rose, whereas nonfarm family income declined. In 1983 this relationship is likely to be reversed as a result of the summer drought.

During the past decade the real income position of families has eroded, whereas nonfamily households<sup>3</sup> have maintained or improved their level of real income. Income remains much lower in nonfamily households than in families, however. Nonfamily households rely on transfer payments and other nonearned sources of income more than families do. Until very recently, nonearned income, such as social security benefits which are indexed to increases in consumer prices, has grown more rapidly than wages and salaries.

The decline in family income and the maintenance and improvement in nonfamily income is especially pronounced when after-tax income is examined. Since nonfamily households tend to be concentrated at the low end of the income distribution, the redistributive aspect of the Federal income tax system, coupled with extra exemptions for older persons and nontaxed transfer payments, have acted to preserve the disposable income of these households (7). At the same time, the tax burden on family households has risen faster as a result of rising nominal incomes and little offsetting increase in personal exemption and zero-bracket amounts. The larger the family, the greater has been the rate of increase in relative tax burden. For example, a couple earning median income with two dependents will pay about 9.9 percent of the 1984 earnings in Federal income tax, compared with 6.0 percent in 1960. A couple with four dependents will pay 8.4 percent in 1984, compared with 2.6 percent in 1960 (5).

Although real income may rise for all types of households in 1983 and 1984, these trends suggest that nonfamily households may experience a larger increase in disposable income than will families. This pattern could change, however, if pretax income in families increases at a faster rate than in nonfamily households. This could be the case if earnings continue to increase significantly more rapidly than transfer payments.

Changes in the level of family income are accompanied by changes in the number and percent of persons below the poverty line. In 1982, when real median income declined 1.4 percent, the poverty rate rose from 14.0 to 15.0 percent. Poverty rates increased among white, persons of Spanish origin, and blacks. The age structure of poverty changed significantly in 1982 with the poverty rate among children under 18 years old rising from 19.8 to 21.7 percent, while the rate among persons 65 years and over showed no significant change from the previous year (8).

Poverty rates are influenced not only by income but also by eligibility standards for Government aid programs and by inflation, which affects the

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<sup>3</sup> Includes primarily persons living alone, including an increasing number of young persons delaying marriage and older, retired persons.

poverty threshold.<sup>4</sup> In the absence of major changes in eligibility standards, rising family income and moderating inflation in 1983 and 1984 should act to reduce the poverty rate.

Employment is the major factor influencing income. Personal and family income are expected to increase overall in 1983 and 1984 not because the earnings of currently employed workers will rise significantly, but rather because the number of employed persons is expected to rise and the incidence of unemployment to decline. Workers with jobs during all of 1980, for example, earned 2-1/2 times as much as those who were unemployed during all or part of the year (6). In 1981 families with one or more unemployed members had a median income about 33 percent less than families with no unemployment (9).

During 1983 unemployment has declined from the post World War II record of 10.8 percent in December 1982.<sup>5</sup> In September civilian unemployment was 9.2 percent. There has also been a reduction in the number of persons involuntarily working part time because of the unavailability of full-time jobs. During the same period, the number of employed persons has grown by 2.5 million, with adult men and women sharing about equally in the increase. Average hours of work and hourly earnings have edged upward slightly during the first half of 1983. The employment earnings picture is expected to continue slowly improving into 1984, with unemployment at the end of the year in the 8.0 to 8.5 percent range.

The long-term forecast for employment and income is mixed, however. In a report entitled The Future of Work, the AFL-CIO predicts persistently high unemployment throughout the eighties as a result of technology replacing workers, the high exchange value of the dollar encouraging imports, and rapid entry of women, minorities, and young people into the labor force (1). They also predict that the labor force will become polarized into a two-tier occupational structure with executives, scientists, engineers, and managers in one group and low-paid workers performing unskilled, repetitive, and replaceable tasks in the other. This polarization and loss of a skilled, middle class will result in a widening earnings and income gap between workers.

Others argue that the introduction of high technology jobs will result in only a modest rearrangement in the income and occupational structures (4) and that changes in jobs can have a positive effect on work (3). As jobs have changed, so have family labor force patterns. Many of the low responsibility, unskilled, and replaceable jobs available in the service sector, for example, blend well with family responsibilities, resulting in continued growth in the number of two-earner families. The income position of the middle class may be as much influenced by this as by the potential polarization of occupations. Technology may allow more decentralization of work, which could result in

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<sup>4</sup> The poverty threshold for a family of four was \$9,862 in 1982. The threshold is expected to increase to about \$10,200 in 1983.

<sup>5</sup> Employment data is published monthly in News and Employment and Earnings, U.S. Department of Labor, Bureau of Labor Statistics.



increased flexibility and control over work schedules and less conflict between work and family roles.

### Expenditures

Consumer expenditures, which account for about two-thirds of transactions in the U.S. economy, are poised for an upturn. The Index of Consumer Sentiment, which often signals improvement in buying plans, measured 91.5 in the second quarter of 1983, the highest level since 1972.<sup>6</sup> Overall, economic indicators show incomes are rising, household debt loads are relatively low, and asset levels are high. In spite of this apparent willingness and ability of consumers to buy, a major burst of spending has been slow to start in 1983. After increasing in the spring, retail sales declined 1.4 percent in August. This 1-month decline in sales may be attributed to isolated conditions such as shortages of new cars, the telephone strike, and Hurricane Alicia. By year end and into 1984, consumer spending is expected to show a sustained upward trend.

Prices and the rate at which they change are major factors influencing spending. During the first 9 months of 1983, the Consumer Price Index for all Urban Consumers (CPI-U) rose at a seasonally adjusted annual rate of 3.7 percent. The compound annual rate of inflation for the 3 months ending in September was 4.4 percent, slightly higher than the 3.9-percent rate in 1982.

Energy prices have been the dominant factor influencing the CPI-U during 1983 (2). In the first quarter of the year, energy costs decreased at a 25.1 percent annual rate. In the second quarter, energy costs increased at a 21.0 percent annual rate to nearly offset the earlier decline. In recent months, gasoline and household fuel prices advanced slightly. Shelter costs, excluding energy, have increased in 1983 at a slightly faster rate than in 1982. Medical care services, transportation services (including auto financing and public transportation costs), and food prices have increased at a lower pace thus far in 1983 than in 1982. The prices for commodities used by families--such as new cars, household furnishings, and apparel--fluctuate widely from month to month, but as a group have increased at about the same or slightly slower rate than in 1982.

Forecasts for consumer price inflation in 1984 range from 4.5 to 6.0 percent, depending on expectations for food prices and interest rates. Most forecasts indicate a slightly accelerating rate over the course of the year. Underlying the moderating rate of inflation in 1983 and 1984 are relatively small increases in wage demands. Increases in wages have been lower this year than in the past 20 years and are expected to remain low in 1984. Labor costs comprise about two-thirds of the costs of producing and distributing consumer goods and services. With low and predictable increases in costs of this factor of production, the likelihood of unanticipated spurts in prices in 1984 is very low.

High and unanticipated inflation in past years created a variety of problems and generated some consumer spending and financial management

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<sup>6</sup> This measure of consumer confidence is collected as part of the Survey of Consumer Attitudes, by the Institute for Social Research, University of Michigan. Richard T. Curtin is director of the survey.



practices with detrimental, long-term consequences for families. Many families are now living with the consequences of decisions based on inflationary expectations. In periods of rapid inflation, market information about prices quickly becomes obsolete. This can lead to careless purchasing or buying in anticipation of price increases rather than buying to meet real needs. Inflation reduces the value of cash balances, leading some families to completely deplete cash reserves in favor of illiquid, but inflation-resistant, assets. Inflation also reduces the real costs of borrowing, encouraging families to mortgage future earnings to meet current consumption wants and needs. Inflation can lead to short-term investment rather than long-term capital development. Although all of these practices may be appropriate and effective when inflation rates are high and accelerating, as inflation rates moderate and stabilize, new spending criteria and financial management practices need to be developed.

Interest rates exert a major influence on consumer spending, particularly for durables such as appliances, autos, and houses. The sensitivity of consumers to changes in interest rates is evidenced in the sharp upswings and downturns in demand for houses and autos that accompany changes in mortgage and installment credit rates. These shifts are attributable both to changes in families' ability to qualify for credit at different interest rates and to their willingness to pay the finance charges associated with borrowing money.

From autumn of 1982 through late spring of 1983, interest rates (including home mortgage and installment rates) trended steadily downward. In early summer, however, rates again began to climb, with home mortgage rates peaking at 13.7 percent in July. Real interest rates, that is, nominal rates adjusted for inflation, continue to be historically high in spite of the economic recovery. For example, adjusting the current mortgage rate of 13.7 percent for the 4.4 percent annual rate of increase in the CPI-U, real mortgage rates are about 9.3 percent, or twice the level of real rates in 1960.

Opinion is strongly and widely divided on the outlook for interest rates in 1984. At issue is the impact of funding the Federal budget deficit on the demand for credit. Those who see interest rates rising argue that funding the Federal deficit will squeeze the credit markets, putting renewed pressure on rates. Others argue that rates can be stabilized through the use of monetary policy and continued efforts to control the deficit. Under either circumstance, the forecasts do not call for major swings in rates charged to consumers in 1984.

Interest rates paid by consumers in 1984 will continue to be influenced by deregulation in the banking industry which began in 1980. During the past 3 years, interest rates and deposit terms on savings and transaction accounts at commercial banks and thrift institutions have been deregulated. One result of this process has been an increase in market-determined, variable interest rate accounts, which impose higher costs on financial institutions than did older, fixed rate accounts. As interest rate ceilings are eliminated and more money earns floating rates of return, financial institutions may need to increase the interest rates charged on consumer loans and/or create variable interest rate loan instruments to match the new variable rate deposit instruments. Many such

instruments have already been developed for home mortgages.<sup>7</sup> Similarly, variable rate auto financing is now offered in several States, and variable rate lines of credit tied to home equity have been introduced nationwide.

#### Balancing Income and Expenditures

The ability of families to balance their income and spending needs can be generally assessed by examining trends in credit use and saving in the household sector of the economy. After more than a year of low levels of credit use and steady saving rates, the net worth position of households was very strong at the beginning of 1983. During the year, credit use expanded slightly and saving declined. Nonetheless, households will enter 1984 in a strong net worth position with capacity for spending and acquiring new debt. As the economic recovery progresses, resulting in a broader base of employment and higher family income, both credit and saving should expand in 1984.

Credit use generally declines with consumer spending during a recession. Families pay off almost as much old debt as they acquire new. Not only does the volume of credit transactions decline during recessions but the relationship of credit use to saving changes. Over the past decade, households have saved about \$1.70 for each dollar of debt acquired.<sup>8</sup> In 1982 the net saving-to-debt ratio increased to 3.6, indicating that at the depth of the recession households saved about \$3.60 for each dollar of new debt acquired. Beginning in early 1983, the net saving-to-debt ratio declined to about 2.2 and is continuing to trend downward. The volume of credit, particularly home mortgages, also increased in early 1983, indicating that households were returning to nonrecessionary patterns of credit buying.

Savings dropped to 3.9 percent of disposable personal income in May as households increased personal expenditures. The rate of saving has fluctuated widely over the past 2 years from 6.6 percent in 1981 to the current low rate. The volume and rate of saving are expected to increase with family income in 1984.

In recent years the forms of household savings have varied as much as the rate of saving. Through 1981 there was a long-term trend toward increased saving in tangible assets and decreased saving in financial assets. The expansion of money market fund investments in 1981 and 1982, stabilizing real estate values, and the introduction of new money market instruments at banks and thrift institutions have somewhat checked this trend.

As interest rates have become more volatile, families have become more rate sensitive as shown in an increasing number of savings and investment transactions in recent years. At the same time, new special purpose savings accounts, such as Individual Retirement Accounts (extended to all earners in

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<sup>7</sup> See "Alternative mortgage instruments," by Carolyn S. Edwards, Family Economics Review 1982(4)1:18.

<sup>8</sup> Calculated as a ratio of net increase in assets to net increase in liabilities in the household sector, using "Flow of Funds" data from the Federal Reserve System.

1983), may lead to deposits being held longer and greater stability in family savings balances.

### Family Financial Management

During the past decade the environment in which families make economic decisions has been shaped by four underlying trends: The aging of the population, increasing labor force participation among women, growing diversity in family living arrangements, and advancing technology applied to information management. These trends--combined with supply and price shocks in fossil fuels, frequent world and national political changes, and declining confidence in public institutions--led to pervasive economic uncertainty in the late 1970's and early 1980's. Families responded, in part, by moderating their expectations for the future. Although living standards<sup>9</sup> may not have declined for most families over the past several years, it is also unlikely that they have risen. The one positive legacy of economic instability and uncertainty may be reduced pressure to always have more. Steady living standards would allow family resources to catch up with family goals.

The process of managing economic resources within the family has always been complicated because of the need to balance current and long-term goals and the difficulty of responding to the needs and goals of several members at one time. In recent years, it has also been complicated by uncertainty about economic conditions outside the control of the family. The outlook for 1984 is for relatively stable economic conditions. Uncertainty will focus primarily on issues of degree rather than direction of economic trends.

Although 1984 may offer a break from the economic uncertainty that has characterized the past decade, the financial management tasks of families will continue to be performed in a complex economic environment. Deregulation of financial and other consumer services and technological advances that allow specific cost-accounting and billing, will expand the choices and increase the decisionmaking responsibilities of families in 1984. The market will offer a broadening array of financial instruments and services and the distinctions between financial institutions will blur. At the same time that financial choices increase, costs paid directly by consumers will also increase. Prices will be based on individual service costs and consumers will pay for exactly what they use. No longer will costs of some services subsidize the costs of others. New pricing will also develop for other consumer services. For example, growing competition in the communications industry and reorganization of the Bell system will result in unit pricing for most telephone services.

New pricing for services will also be evident in the increasing share of savings and credit instruments that carry variable interest rates. This means that to effectively manage resources, financial managers will need to collect more information and engage in complex calculations and analyses to compare the long-term costs and benefits of alternatives. As consumers are no longer charged an averaged rate for service costs and no longer earn an averaged rate of return on their assets, those unable or unwilling to shop for lowest costs

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<sup>9</sup>The term "living standards" is used here to mean the level of consumption and style of life that individuals and families aspire to attain.



and best returns are destined to realize a significant increase in costs and decline in benefits in 1984.

Family financial management will be influenced in 1984 and beyond by several trends which signal growing reliance on individual responsibility and decreased institutional involvement in family financial affairs. For example, several States have repealed or eased usury laws leaving the market to set consumer interest rates and individuals to recognize and reject unreasonably high rates. Another approach to increasing individual responsibility has been use of the Federal income tax structure to encourage families to save for retirement through Individual Retirement Accounts and ultimately ease pressure on socially-supported retirement income programs in the future. Families unable or unwilling to assume individual responsibility for protecting themselves in the financial and consumer markets or taking advantage of planning incentives may find their economic position deteriorating at the same time that social support is declining.

The underlying factors driving the economy during the past decade will continue to exert important influences throughout the eighties. In the short-term, the aging population and increasing labor force participation of women will benefit society through an increase in the number of older, experienced workers and growth in the ratio of workers to nonworkers. In the longer term, however, the aging population will retire, reducing the resources needed for continued economic expansion and refocusing economic concerns on issues of equity and distribution.

Families will enter the mid- and late-1980's in a strong economic position with improved prospects for employment and earnings, stabilizing prices, historically high asset levels, reduced debt loads, and realistic expectations for the future. The remainder of the decade will offer families a relatively stable economic period in which to adjust to increased economic complexity and renewed individual financial responsibility. This adjustment will require that families increase their level of financial management activities.



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Comparison of median family money income in 1982 and 1981, by selected characteristics

Characteristic	Median family income			Percent change in real money income
	1982	1981		
		Constant dollars	Current dollars	
All families .....	\$23,433	\$23,761	\$22,388	-1.4
Type of family:				
Married couple families .....	26,019	26,598	25,065	-2.2
Wife in paid labor force .....	30,342	31,040	29,247	-2.2
Wife not in paid labor force ...	21,299	21,571	20,325	-1.3
Female householder, no				
husband present .....	11,484	11,632	10,960	-1.3
Race of householder:				
White .....	24,603	24,959	23,517	-1.4
Black .....	13,599	14,079	13,267	-3.4
Spanish origin .....	16,228	17,406	16,402	-6.8
Residence:				
Nonfarm .....	23,585	23,937	22,554	-1.5
Farm .....	18,756	18,129	17,082	3.5
Region:				
Northeast .....	24,918	25,159	23,706	-1.0
North Central .....	24,219	24,535	23,118	-1.3
South .....	21,500	21,844	20,582	-1.6
West .....	24,624	25,337	23,873	-2.8
Number of earners:				
No earners .....	9,911	9,987	9,410	-0.8
1 earner .....	18,913	18,707	17,626	1.1
2 earners .....	28,073	28,507	26,860	-1.5

Source: U.S. Department of Commerce, Bureau of the Census, 1983, Money income and poverty status of families and persons in the United States: 1982, Current Population Reports, Series P-60, No. 140, (advance data from the March 1983 Current Population Survey).

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The 1980 census classified 98 percent of the total land area of the United States as rural and 2 percent as urban. The population distribution, however, was quite different with 1/4 the population living in the rural and 3/4 living in the 2 percent urban land classification. Changes in criteria for the designation of metropolitan areas, as defined by the Office of Management and Budget, and changes in our population distribution resulted in a marked increase between 1970 and 1980 in the number of Standard Metropolitan Statistical Areas (SMSAs) from 243 to 318 SMSAs. These geographical classifications--urban/rural; metropolitan/nonmetropolitan--will be described along with selected 1980 findings concerning the rural and nonmetropolitan housing inventory.

### Geography

1. What Is Urban and What Is Rural? The Census Bureau employs a set of criteria that distinguish urban and rural areas. Essentially, the criteria are used to sort out the urban geography, leaving all the remaining geography to be classified as rural. In censuses prior to 1950, the urban population comprised all persons living in incorporated places of 2,500 or more inhabitants and areas (usually minor civil divisions) classified as urban under special rules relating to population size and density.

To improve its measure of the urban population, the Bureau of the Census in 1950 adopted the concept of urbanized area and delineated boundaries for unincorporated areas. For the 1980 census, an urbanized area comprises an incorporated place and adjacent densely settled surrounding area that together have a minimum population of 50,000. Also classified as urban are incorporated or census designated places of 2,500 or more population.

2. What Is Metropolitan and What Is Nonmetropolitan? The general concept of a metropolitan area is one of a large population nucleus, together with adjacent communities which have a high degree of economic and social integration with that nucleus. These areas are known as Standard Metropolitan Statistical Areas (SMSAs).<sup>1/</sup>

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<sup>1/</sup> Beginning in 1983, the term "Standard Metropolitan Statistical Areas" will no longer be used. The new terminology is "Metropolitan Statistical Areas." The former term is used in this paper, however, to reflect terminology used in published 1980 census data.

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Each SMSA has one or more central counties containing the area's main population concentration: an urbanized area with at least 50,000 inhabitants. An SMSA may also include outlying counties which have close economic and social relationships with the central counties. There are 318 SMSAs designated in the United States for the 1980 census.

3. Historical Changes in Urban and Rural Areas. The United States was a predominantly rural nation until well into the twentieth century. Not until 1920 did census data show that a majority of the Nation's people lived in urban areas. Urbanization increased during the 1920s, slowed down in the 1930s, then continued to increase through the 1960s.

Decennial censuses since 1790 have shown a greater percentage increase in the urban population than in the rural population, except for the 1810-1820 decade. This historical pattern was modified in the 1970-1980 decade, when the population of rural areas grew almost as fast as that of urban areas, 11.1 percent and 11.6 percent, respectively, and both rates of change were close to the total population growth of 11.4 percent. As a result the percentage of population living in rural areas in 1980 (26.3 percent) was virtually unchanged over the 1970 rural rate (26.4 percent). See Figure 1.

Growth rates for housing units in urban and rural areas were also very close to the overall national increase of 28.7 percent. The urban growth rate was 29.5 percent, and the rural rate, 26.6 percent.

4. Urban and Rural Land Area. At the time of the 1980 census, the total land area of the United States was 3,539,289 square miles. The rural portion was 3,465,359 square miles, or 97.9 percent, and the urban classification included 73,930 square miles, or 2.1 percent.

Even with the 83.7 percent net increase in urban land area from 1960 to 1980 (from 40,238 to 73,930 square miles), the decrease in the rural percentage has been slight in the past 20 years. Rural area covered 98.5 percent of U.S. land area in 1970 and 98.9 percent in 1960. See Table 1.

In 1980 the greatest amount of rural territory was in the West region, which contained about 1/2 the Nation's rural land area. The Northeast had the smallest amount of rural land, about 150,000 square miles. Even in that highly urbanized, demographically mature region, however, rural land comprised 91.9 percent of total land area. See Table 2.

Table 1. URBAN and RURAL LAND AREA: 1960-1980  
(Land area in thousand square miles)

	Total land area	Urban		Rural	
		Land area	Percent	Land area	Percent
1980	3,539.3	73.9	2.1	3,465.4	97.9
1970	3,536.9	54.1	1.5	3,482.8	98.5
1960	3,540.9	40.2	1.1	3,500.7	98.9



Table 2. URBAN and RURAL LAND AREA by REGION: 1980  
(Land area in thousand square miles)

Region	Total land area	Urban		Rural	
		Land area	Percent	Land area	Percent
United States	3,539.3	73.9	2.1	3,465.4	97.9
Northeast	162.7	13.3	8.1	149.6	91.9
North Central	752.1	17.5	2.3	734.7	97.7
South	873.0	29.5	3.4	843.6	96.6
West	1,751.4	13.8	0.8	1,737.6	99.2

As the number of SMSAs increased from 212 in 1960 to 318 in 1980, and as many SMSAs were revised to include additional counties, the land area contained within metropolitan areas increased dramatically. These areas comprised 310,233 square miles in 1960, or 8.8 percent of total land area. In 1980, the land area within SMSAs was 566,148 square miles, or 16.0 percent of the U.S. land area. Expansion of the number and geographical territory of SMSAs resulted in an increase in the proportion of rural population within metropolitan areas from 24.6 percent in 1960 to 40.3 percent in 1980.

#### Population Distribution

5. Urban and Rural Population Distribution. Where do Americans live? To answer this question in the simplest geographical terms, the place of residence of all resident Americans is classified as either urban or rural; and either metropolitan or nonmetropolitan. In 1980, about 3/4 the U.S. population lived either in urban or in metropolitan areas. Conversely, about 1/4 the U.S. population lived either in rural areas or in nonmetropolitan areas.

Since urban and rural classifications cut across metropolitan area boundaries, urban/rural and metropolitan/nonmetropolitan are not interchangeable pairs of terms, either in concept or in statistics. In 1980, although most of the rural population was in nonmetropolitan areas (59.7 percent) a sizeable proportion lived within SMSAs (40.3 percent). The urban population, however, was more closely allied with metropolitan territory, with 87.1 percent inside SMSAs and 12.9 percent outside SMSAs. See Table 3.

The most rural region in terms of population was the South, where 33.1 percent of the population lived in rural areas. The West was the least rural region--only 16.1 percent of the population was in rural territory. The rural percentages in the other regions were closer to the national rate, 20.8 percent in the Northeast and 29.5 percent in the North Central region.

Metropolitan areas include greater proportions of the rural population in the Northeast and West regions, than in the South and North Central regions. In the Northeast, 54.3 percent of rural population lived within SMSAs and in the West, 43.7 percent. SMSAs in the North Central and South regions contained 38.8 and 34.7 percent of the rural population, respectively.

Table 3. DISTRIBUTION of URBAN and RURAL POPULATION  
by METROPOLITAN RESIDENCE: 1980

A. Distribution of Total Population (thousands)

	Total	Metropolitan (Inside SMSAs)	Nonmetropolitan (Outside SMSAs)
Total	226,546	169,431	57,115
Urban	167,051	145,443	21,608
Rural	59,495	23,988	35,507

B. Percentage Distribution of Total Population

	Total	(Inside SMSAs)	(Outside SMSAs)
Total	100.0	74.8	25.2
Urban	73.7	64.2	9.5
Rural	26.3	10.6	15.7

C. Percentage Distribution of Urban and Rural Population  
by Metropolitan Residence

	Total	(Inside SMSAs)	(Outside SMSAs)
Total	100.0	74.8	25.2
Urban	100.0	87.1	12.9
Rural	100.0	40.3	59.7

6. Urban and Rural Densities. In the period from 1970 to 1980, the population density of the total population increased from 57.5 to 64.0 persons per square mile, or 11.3 percent, while rural population density increased from 15.5 to 17.2 persons per square mile, or 11.0 percent. With an average of 2.95 persons per household, this represented a land area of 110 acres per household for all rural territory.

During the 1970s there was an overall lowering of urban densities throughout the Nation, in central cities, suburbs, and small towns and cities. The decrease in densities resulted from the geographical expansion of urbanized areas, increase in the number of urban places, annexations to cities and other urban places, and an overall decrease in average household size. The effect of these geographical changes is seen in decreases in densities ranging from about 17 to 22 percent in all segments of urban territory. See Table 4.

Table 4. POPULATION per SQUARE MILE: in URBAN and RURAL AREAS: 1960-1980

Year	United States	Urban					Rural
		All Urban	Inside Urbanized areas			Other Urban Places	All Rural
			Total	In central cities	Urban fringe		
1980	64.0	2,260	2,675	3,551	2,177	1,272	17.2
1970	57.5	2,760	3,376	4,463	2,627	1,623	15.5
1960	50.6	3,113	3,752	5,349	2,575	2,003	15.4
Percent change: 1970-1980	11.3	-18.1	-20.8	-20.4	-17.1	-21.6	11.0

The average density of 2,675 persons per square mile for urbanized areas represents about 4.2 persons per acre, or about 3 households for every 2 acres of land area. For all urban areas, the average density was about 4 households for every 3 acres of land.

The population density of SMSAs decreased from 360 to 299 persons per square mile from 1970 to 1980. Densities of urbanized areas also decreased. However, in the remaining SMSA territory outside urbanized areas--which contains urban places and rural area--density has been stable since 1960, in a range of about 59-60 persons per square mile. Density of areas outside SMSAs has also remained stable since 1960, in a range of about 19-21 persons per square mile. In 1980 the density of rural population outside SMSAs was 12.0 persons per square mile. See Table 5 and Figure 2.

Table 5. POPULATION per SQUARE MILE, by METROPOLITAN LOCATION: 1960-1980  
(Population in millions; land area in thousand square miles)

Metropolitan location	1980	1970	1960
<u>Inside SMSAs</u>			
Population	169.4	139.4	112.9
Land area	566.1	387.6	310.2
Population per square mile	299	360	364
<u>Urbanized areas</u>			
Population	139.2	118.4	95.8
Land area	52.0	35.1	25.5
Population per square mile	2,675	3,376	3,752
<u>All other areas<sup>1/</sup></u>			
Population	30.3	21.0	17.1
Land Area	514.1	352.5	284.7
Population per square mile	58.9	59.5	59.9
<u>Outside SMSAs</u>			
Population	57.1	63.8	66.4
Land Area	2,973.1	3,149.2	3,230.7
Population per square mile	19.2	20.3	20.6
<u>Rural</u>			
Population	35.5	NA	NA
Land Area	2,949.8	NA	NA
Population per square mile	12.0	NA	NA

<sup>1/</sup> Approximate. Obtained as difference of SMSA and Urbanized Area values, although a small number of urbanized areas, or some small parts of some, are outside SMSAs.

### Housing Distribution

7. 1980 Profile. In 1980, the distribution of the Nation's housing was similar to population distribution in broad geographical terms. Rural areas contained slightly more than 26 percent of both population and housing.

In contrast with the urban living environment of the majority of the Nation, rural population and housing were located primarily in very small places (less than 1,000 persons) or in territory having no recognized incorporated or unincorporated place designation. See Table 6.

Table 6. PERCENTAGE DISTRIBUTION of POPULATION and HOUSING,  
by URBAN and RURAL RESIDENCE: 1980

	<u>Total Population</u>	<u>Total Housing units</u>
Total number (thousands)	226,546	88,411
Percent of U.S.	100.0	100.0
Urban	73.7	73.5
Inside urbanized areas	61.4	61.0
Rural	26.3	26.5
Places of 1,000 to 2,500	3.1	3.3
Places of less than 1,000	1.7	{ 23.3
Other rural	21.4	

8. Regional Pattern. Housing units were unevenly divided among the 4 main regions of the country in 1980. The largest proportion, 33.3 percent, was in the South. The next greatest regional share (25.8 percent) was located in the North Central Region. Of the remaining 40.9 percent of housing units, 21.6 percent was located in the Northeast and 19.3 percent in the West. See Table 7 and Figures 3 and 4.

There were 6 states with more than one million rural housing units, representing 30.2 percent of the Nation's total rural housing in 1980. This group includes New York and Pennsylvania in the Northeast; Ohio and Michigan in the North Central region; and North Carolina and Texas in the South.

Table 7. PERCENTAGE DISTRIBUTION of URBAN and RURAL HOUSING, by REGION: 1980  
(Housing units in thousands)

<u>Region</u>	<u>Housing Units</u>		
	<u>Total</u>	<u>Urban</u>	<u>Rural</u>
Total	88,411	64,939	23,472
Percent of U.S.	100.0	100.0	100.0
Northeast	21.6	23.0	17.6
North Central	25.8	24.6	29.2
South	33.3	30.5	40.9
West	19.3	21.8	12.4

#### Housing Characteristics

9. Owner and Renter Households. In 1980, while homeowners were predominant in both urban and rural areas, owner households were more likely to be found in the rural areas. Rural areas contained 30.6 percent of owner-occupied units. Only 14.0 percent of renter households were located in rural areas. See Table 8.

In terms of actual numbers, urban areas contained 35.9 million owner households and 24.6 million renter households. In rural areas, homeowners outnumbered renters by 15.8 to 4.0 million.



Table 8. OWNER and RENTER HOUSEHOLDS in URBAN and RURAL AREAS: 1980  
(Households in thousands)

	Total	Percent	
		Urban	Rural
Owner households	51,795	69.4	30.6
Renter households	28,595	86.0	14.0

Urban and rural ownership rates reflect these distribution patterns. The U.S. ownership rate was 64.4 percent in 1980, 59.4 percent in urban areas and 79.9 percent in rural areas. The rural ownership rates were higher than urban rates in all regions. The greatest gap between rural and urban homeownership was in the Northeast, with 81.0 percent in rural, and only 53.7 percent ownership in urban areas. See Table 9.

Table 9. HOMEOWNERSHIP RATES, URBAN and RURAL, by REGION: 1980

Region	Percent Owner-occupied		
	Total	Urban	Rural
United States	64.4	59.4	79.9
Northeast	59.0	53.7	81.0
North Central	68.8	63.9	81.7
South	67.0	61.3	79.4
West	60.3	57.7	75.3

10. Recent Housing Construction. The Nation's housing was "younger" in 1980 than ever previously recorded in a housing census. With a median age of 22.7 years, about 1/4 (26.2 percent) the housing inventory was in structures built from 1970 to March 1980. See Table 10 and Figure 5.

About 1/4 the total housing units (25.8 percent) were also built prior to 1940. The proportion was slightly higher for rural areas (27.1 percent) than for urban areas (25.4 percent). The regional distribution pattern for pre-1940 housing was virtually the reverse of the pattern for new housing. See Table 10.

Rural areas contributed 1/3 the new housing in the 1970s. The proportion of housing built during the decade in territory which was rural at the time of construction was actually greater, since some rural areas were converted to the urban classification as a result of urbanized area expansions, annexations, and growth of small towns into urban places during the 1970s. See Table 11. In every region the rural share of new housing was greater than the rural share of all year-round units.

11. Units in Structure. The housing in urban and rural areas displays sharp contrasts by structural types. Single-family, detached homes and mobile homes are more likely to be found in rural areas. Almost 1/3 of single, detached housing units and 2/3 of mobile homes were in rural areas. In contrast, more than 90 percent of structurally attached housing units were located in urban areas. These include single attached units and apartments in multi-unit structures. See Figure 6.

In 1980 about 91 percent of rural housing was in single, detached units or mobile homes while in urban areas about 59 percent of housing was in similar types. See Figure 7.

Mobile homes were most prevalent in the South, where 47.2 percent of such units were located. The West also had high representation of mobile homes, where more than 10 percent of owner-occupied units were mobile homes in several states.

Table 10. PERIOD of CONSTRUCTION of URBAN and RURAL HOUSING: 1980  
U.S. and REGIONS

U.S. and Regions	Percent built:		
	1970 to March 1980	1940 to 1969	1939 or earlier
United States	26.2	48.0	25.8
Urban	23.5	51.1	25.4
Rural	34.2	38.7	27.1
Northeast	15.2	42.8	42.0
Urban	12.0	44.5	43.5
Rural	28.0	36.0	36.0
North Central	21.8	45.0	33.2
Urban	19.3	49.3	31.4
Rural	28.0	34.1	37.9
South	33.2	51.1	15.7
Urban	30.6	55.0	14.4
Rural	38.5	43.0	18.5
West	32.3	52.1	15.6
Urban	30.3	54.7	15.0
Rural	42.6	38.5	18.9

Table 11. TOTAL YEAR-ROUND HOUSING UNITS and UNITS BUILT: 1970-1980,  
in URBAN and RURAL AREAS, by REGION: 1980  
(Units in thousands)

	Total Housing			New Housing (Housing units built 1970-1980)					
	Total units	Percent		Total new units	Percent of total units	Urban		Rural	
		Urban	Rural			Units	Percent of new	Units	Percent of new
United States	86,693	74.6	25.4	22,744	26.2	15,184	66.8	7,560	33.2
Northeast	18,516	80.1	19.8	2,808	15.2	1,777	63.3	1,031	36.7
North Central	22,347	71.4	28.6	4,873	21.8	3,077	63.1	1,796	36.9
South	28,998	68.0	32.0	9,628	33.2	6,043	62.8	3,586	37.2
West	16,832	84.0	16.0	5,435	32.3	4,287	78.9	1,148	21.1

12. Selected Housing Characteristics. The 1980 census results showed a great improvement in the quality of housing. This was seen not only in a reduction of the number of housing units with characteristics that have traditionally been used as indicators of inadequate housing, but also in the increases in living space and amenities which are part of residential facilities.

Selected characteristics of urban, rural, and farm housing are shown for the U.S. in Table 12. Important findings are highlighted below. See Figure 8.

- The 1980 census showed the lack of complete plumbing facilities for exclusive use was no longer a major housing problem nationwide. We reduced the number of housing units lacking complete plumbing by slightly over a half, from 4.7 million in 1970 to 2.3 million in 1980--down to only 2.7 percent of year-round units. In rural areas, 5.9 percent lacked plumbing with the South the only region exceeding this rate (8.5 percent). Just 40 years ago, when the first housing census was conducted, the percentages of housing lacking complete plumbing were: all units, 45.3; urban, 23.3; rural nonfarm, 60.6; and rural farm, 89.4 percent.
- There was an average 2.75 persons per occupied unit in 1980, 2.68 in urban households and 2.95 in rural homes. Average household sizes in regions were similar to national trends, in both urban and rural areas. In 1970, average household sizes were 3.11 nationwide, 3.04 urban, and 3.32 rural.
- There were only 4.5 percent of occupied units with 1.01 or more persons per room, in both urban and rural areas, down from 7.3 percent nationwide in 1970.
- The proportion of housing with 3 or more bedrooms was higher in rural areas (58.6 percent), reflecting the predominance of single-family homes in rural areas and the prevalence of multi-unit rental housing in urban areas.
- A higher proportion of urban housing units (87.3 percent) was equipped with central heating systems. The urban percentage was higher in all regions of the country.
- Air conditioning was also more likely to be found in urban homes (58.4 percent). Percentages for urban, rural, and farm housing were substantially higher than nationwide in the South, and substantially lower in the West.
- The 1980 census showed that almost 1/4 the Nation's households had moved into their present residence during the 15-month period of January 1979 to March 1980. Throughout the nation mobility was lower in rural areas and much less for farm residents.
- Americans are very dependent on private transportation, and 87.1 percent of households had 1 or more vehicles (autos, vans, 1-ton trucks) available in 1980. The proportions were higher for rural and farm households, 93.3 and 97.3 percent, respectively.

- ° Less than 1/2 the Nation's rural housing was connected to public water systems or private companies. Nationwide, the sources of water for year-round homes in rural areas included: 9.8 million units with public systems or private company; 9.5 million with individual drilled well; 1.7 million with individual dug well; and 1.1 million using some other source of water.
- ° About 1/4 of rural homes were connected to a public sewer system in 1980.
- ° More than 9/10 of the Nation's homes had telephones in 1980. The percentages for urban, rural, and farm housing were higher than nationwide in the Northeast, North Central, and West regions, and lower in the South. The percentage of farm homes with telephone (95.4 percent) was higher than the percentages in both urban and rural areas.

Table 12. SELECTED CHARACTERISTICS of URBAN and RURAL HOUSING: 1980

<u>Characteristic</u>	<u>Percent of housing units</u>			
	<u>Total</u>	<u>Urban</u>	<u>Rural</u>	<u>Farm</u>
Percent with:				
Lacking complete plumbing for exclusive use <sup>1/</sup>	2.7	1.6	5.9	--
1.01 or more persons per room <sup>2/</sup>	4.5	4.5	4.7	--
1 or more complete bathrooms <sup>1/</sup>	96.7	97.9	93.4	95.5
3 or more bedrooms <sup>1/</sup>	50.5	47.7	58.5	--
Central heating systems <sup>1/</sup>	82.8	87.3	69.5	66.5
Air conditioning <sup>1/</sup>	55.0	58.4	44.8	48.1
Householder moved in 1979-1980 <sup>2/</sup>	22.7	24.2	18.3	8.0
1 or more vehicles available <sup>2/</sup>	87.1	85.0	93.3	97.3
Source of water by public system or private company <sup>1/</sup>	83.6	97.0	44.3	13.1
Public sewer <sup>1/</sup>	74.0	91.4	23.2	1.1
Telephone	92.9	93.8	90.5	95.4

<sup>1/</sup> Year-round housing units.

<sup>2/</sup> Occupied housing units.



13. Heating Fuels. Important changes took place in the Nation's pattern of principal home heating fuel use from 1970 to 1980. Households using electricity increased from 7.7 to 18.4 percent of all households; the actual number increased from 4.9 to 14.8 million. There was also an increase in the percentage of homes using wood, from 1.3 to 3.2 percent. Although the number of households using either utility gas or bottled, liquid or LP gas increased, the percentages of homes in each category decreased. The number of homes using fuel oil and kerosene dropped from 16.4 to 14.7 million, or 26.0 to 18.2 percent. There were also declines in the numbers and percentages of households using coal and other fuels.

In 1980, a wide variety of home heating fuels was used in rural areas. In those areas, the 3 principal fuels were utility gas, electricity, and fuel oil (totalling 69.6 percent). In addition, 17.7 percent of rural homes used bottled, tank or LP gas, and 10.7 percent used wood. Utility gas was the predominant home heating fuel in urban areas (62.8 percent of homes). See Table 13.

Table 13. HEATING FUELS in OCCUPIED HOUSING UNITS  
in URBAN and RURAL AREAS: 1980

Heating fuel	Percent:		
	Total	Urban	Rural
All occupied units (Thousands)	80,390	60,557	19,833
Percent	100.0	100.0	100.0
Utility gas	53.1	62.8	23.3
Bottled, tank, or LP gas	5.6	1.7	17.7
Electricity	18.4	17.4	21.3
Fuel oil, Kerosene, etc.	18.2	16.0	25.0
Coal or coke	0.6	0.3	1.6
Wood	3.2	0.7	10.7
Other fuel	0.2	0.2	0.1
No fuel used	0.7	0.8	0.4

14. Housing Values, Costs, and Household Income. The 1980 census showed substantial increases in home values, gross rent, and household income during the 1970s. The median value of single family homes had the greatest increase, from \$17,000 in 1970 to \$47,200 in 1980, or 177.6 percent. The 1980 gross rent of \$243 was 125 percent higher than the 1970 gross rent of \$108. Gross rent includes contract rent, plus utilities, if paid separately. Median household income increased by 96.5 percent, lower than the percentage increases in both home values and gross rent.

These 3 characteristics show greater percentage increases for rural areas than for urban areas, reflecting the rapid growth in housing and households in rural territory in the 1970s. See Table 14.

Table 14.

INCREASE in HOME VALUES, GROSS RENT  
and HOUSEHOLD INCOME, URBAN and RURAL: 1970-1980

	<u>U.S.</u>	<u>Urban</u>	<u>Rural</u>
Median value:			
1980	\$47,200	\$49,500	\$40,200
1970	17,000	18,100	12,600
Percent increase:			
1970-1980	177.6	173.5	219.0
Median gross rent:			
1980	\$243	\$247	\$208
1970	108	111	84
Percent increase:			
1970-1980	125.0	122.5	147.6
Median household income:			
1980	\$16,700	\$17,100	\$15,900
1970	8,500	8,900	7,300
Percent increase:			
1970-1980	96.5	92.1	117.8

Although the 1970-1980 percentage increases were greater in rural areas, all housing financial indicators available from the 1980 census were higher for urban areas. The single exception to this pattern was renter median income, which was higher in rural than in urban areas in every region except the South. Owners' median income and home values had greater differences between urban and rural areas than any other characteristics. Differences in home values and gross rent were especially sharp between urban and rural areas in the fast-growing South and West regions. See Table 15 and Figures 9, 10, and 11.

Table 15. RATIOS of URBAN and RURAL FINANCIAL CHARACTERISTICS: 1980  
(Figures in dollars)

Characteristic	Total U.S.		Urban		Rural	
	Median	Ratio to U.S.	Median	Ratio to U.S.	Median	Ratio to U.S.
Median household income:						
Owners	20,500	1.00	21,900	1.07	17,400	0.85
Renters	11,300	1.00	11,400	1.01	10,900	0.96
Median home values:	47,200	1.00	49,500	1.05	40,200	0.85
Median gross rent:	243	1.00	247	1.02	208	0.86
Median monthly owner costs:						
Mortgaged homes	366	1.00	371	1.01	346	0.95
Nonmortgaged homes	128	1.00	134	1.05	117	0.91

Median selected<sup>1/</sup> monthly owner costs (Figure 11) were higher for urban than for rural areas in all regions. The urban/rural differences were greatest for mortgaged homes in the Northeast and South. For nonmortgaged homes, the urban homeowner costs were much greater than rural costs in the Northeast, and costs in both the urban and rural areas of that region were higher than median costs in all other regions. There is evidence that real estate taxes and utility costs were the principal factors in the high homeowner costs in nonmortgaged homes in the Northeast.

<sup>1/</sup> Selected monthly owner costs is the sum of payments for real estate taxes, fire and hazard insurance, utilities, and fuels for all specified owner-occupied units, and, in addition, the sum of payments for mortgages and similar payments for mortgaged properties. Specified owner-occupied units include 1-family homes on less than 10 acres without a commercial use or medical office on the property.

Figure 1.

## Urban and Rural Population Distribution: 1890-1980

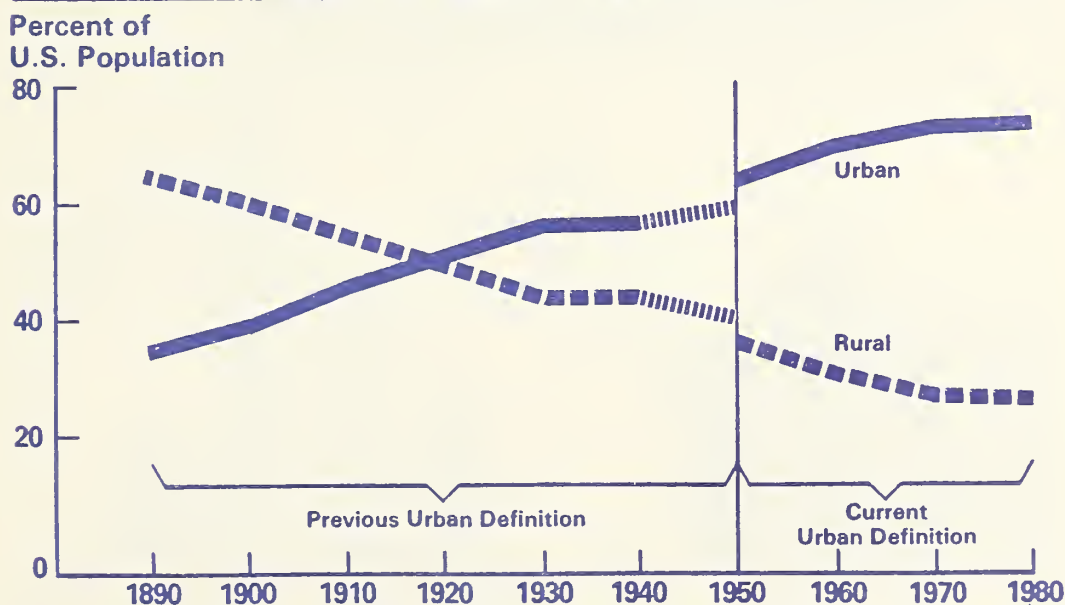


Figure 2.

## Population Densities: 1960-1980

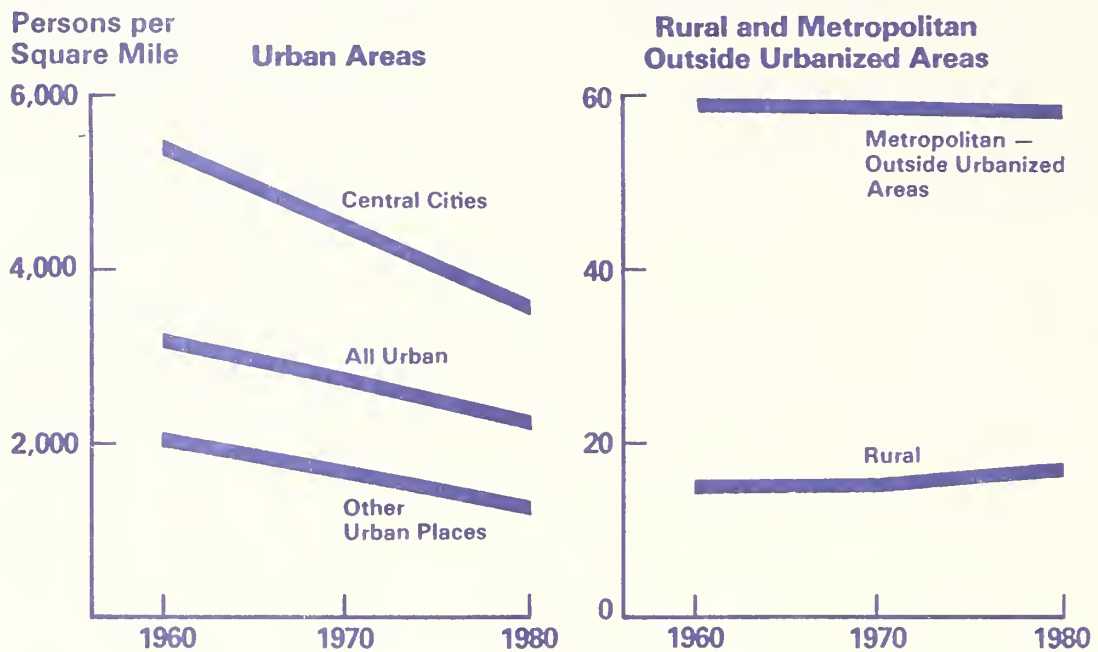


Figure 3.

## Percent of Nation's Urban and Rural Housing in Each Region: 1980

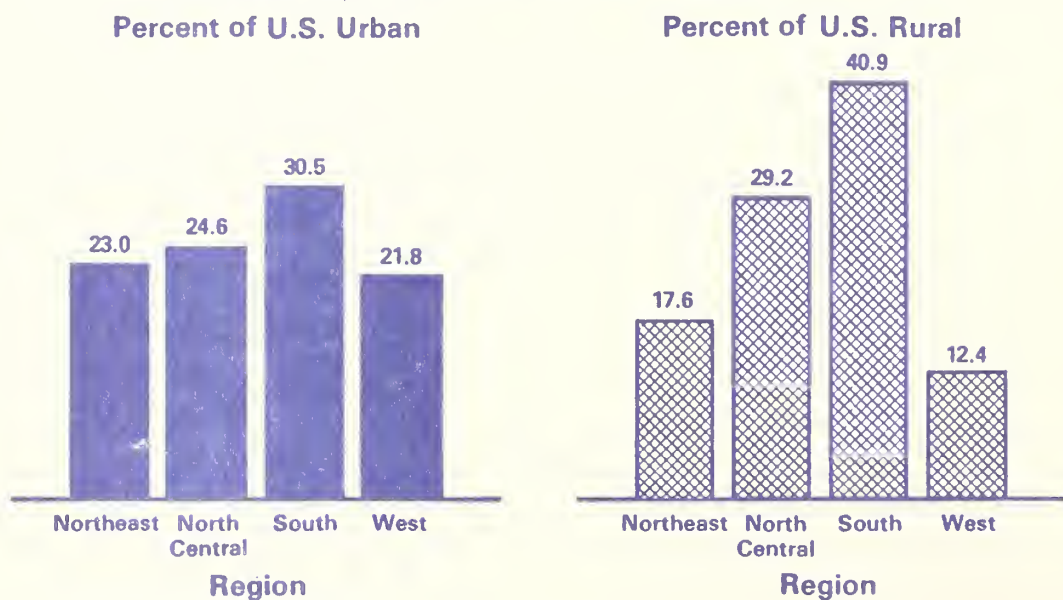




Figure 4.

## Percent Total Housing, Urban and Rural by Region: 1980

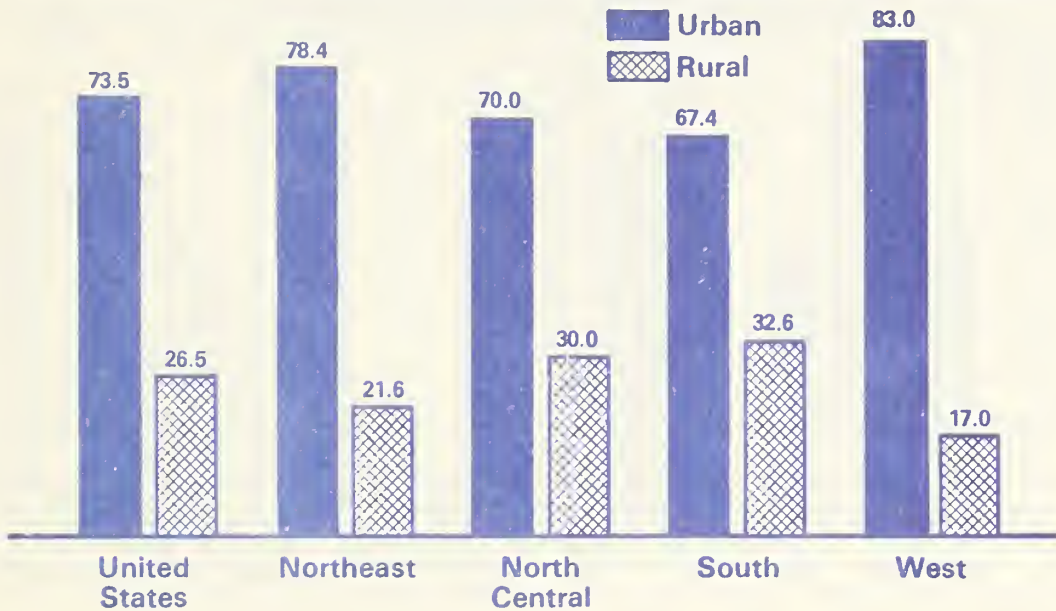


Figure 5.

## Age of Urban and Rural Housing: 1980 U.S. and Regions

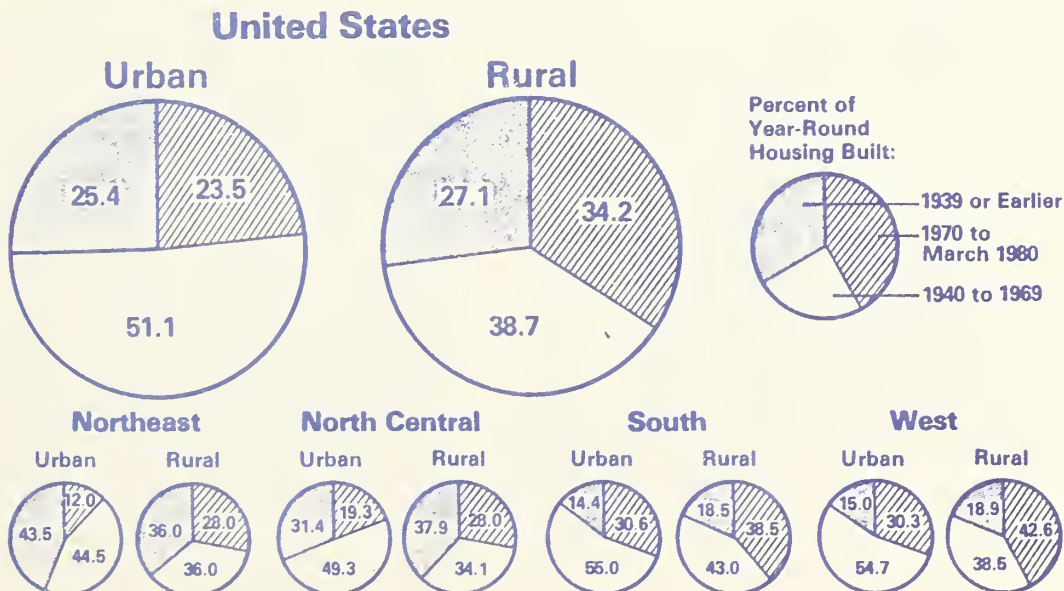


Figure 6.

## Units in Structure in Urban and Rural Areas: 1980

(Percent in Urban and Rural Areas)

Percent of  
Year-Round Units

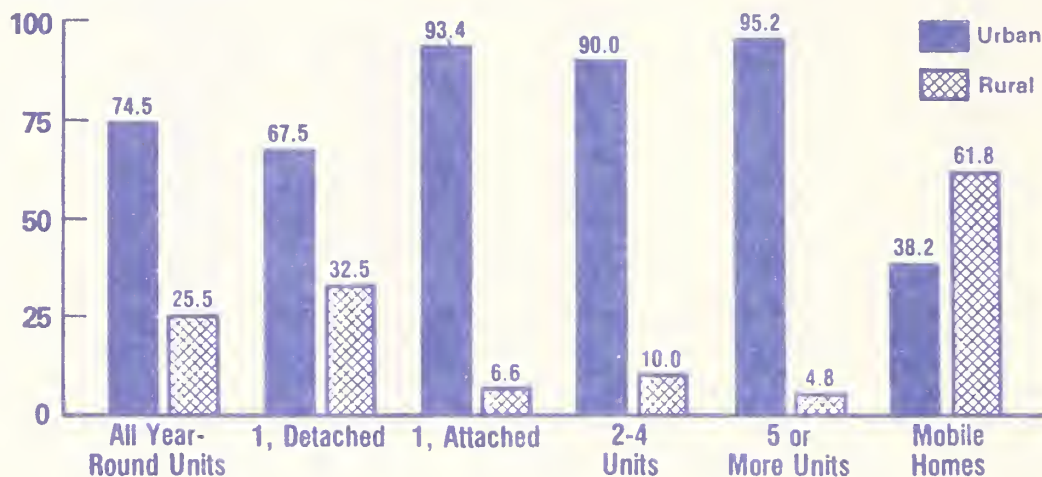


Figure 7.

## Percentage of Structure Types in Urban and Rural Areas: 1980

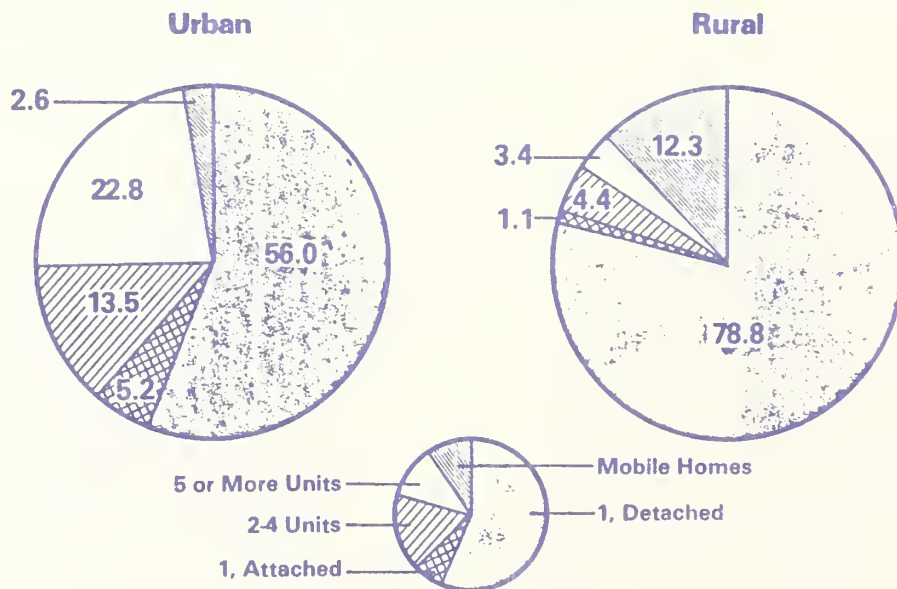


Figure 8.

## Selected Housing Characteristics in Urban and Rural Areas: 1980

Percent of Housing Units

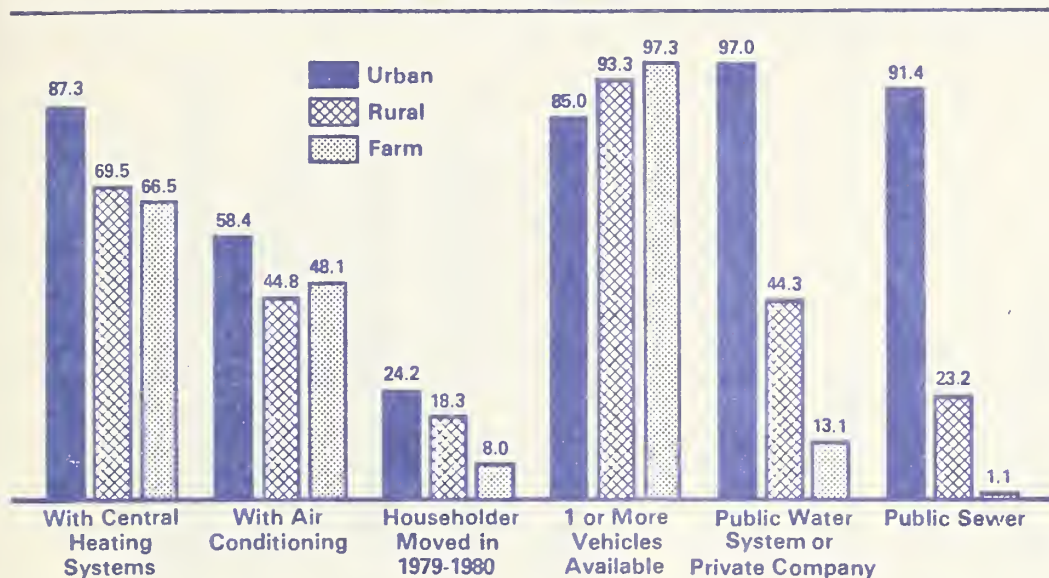


Figure 9.

## Median Household Income in Urban and Rural Areas, by Region: 1980

(Thousands of dollars)

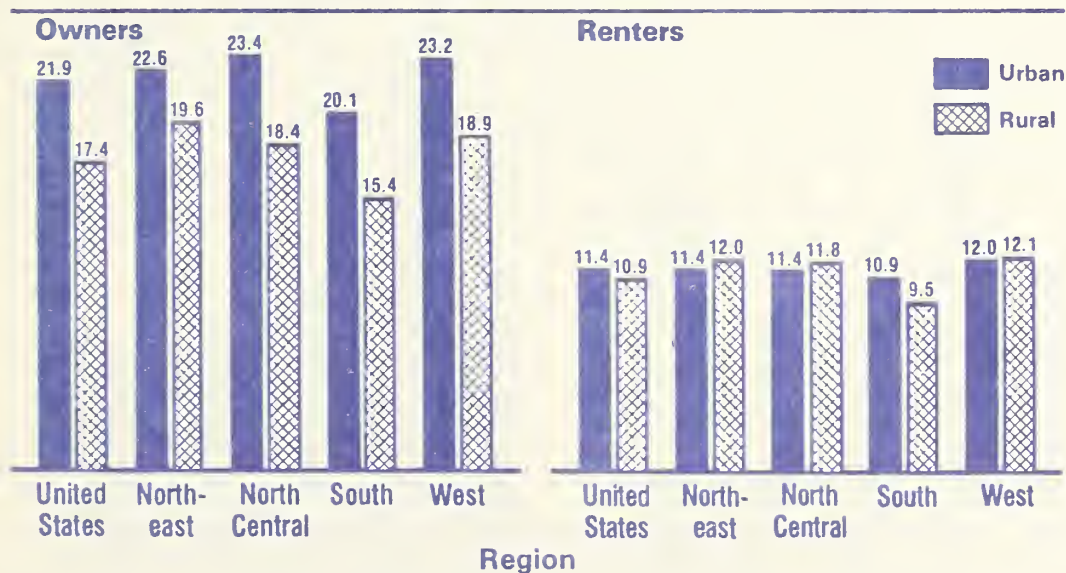




Figure 10.

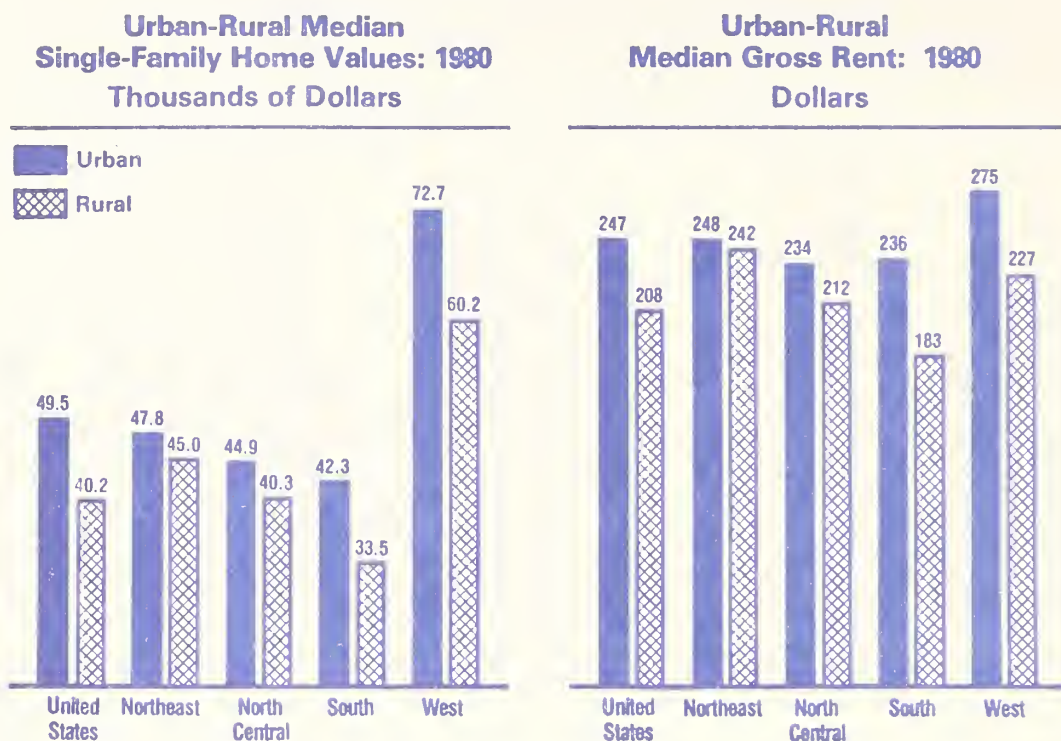
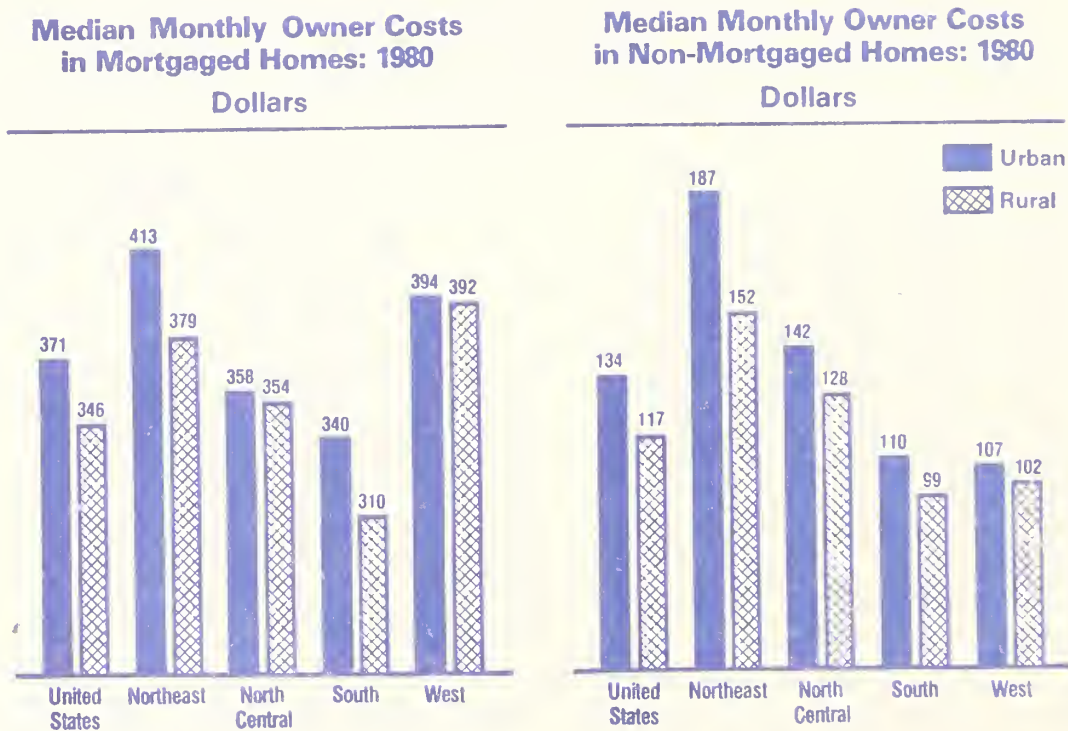


Figure 11.





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## INTRODUCTION

With the improvement in our housing stock, it is becoming popular in some quarters to say that the housing problem has been solved. Such a generalization, however, overlooks a lot. More than one house in ten in our totally rural counties, for example, lacks complete plumbing.

This paper uses data which have just become available from the 1980 Census of Population and Housing to analyze one dimension of geographic variation, degree of rurality, and two dimensions of housing problems, quality and affordability.

The data are presented on a metro-nonmetro continuum developed by the Economic Research Service.<sup>1</sup> Counties are grouped according to the aggregate size of their urban populations and their geographic proximity to metro areas, into four metro and six nonmetro county groupings.

These county groupings add further refinement to the traditional and more broadly defined metro and nonmetro classifications. A later refinement of the scheme required that counties classified as adjacent have at least one percent of the labor force commuting to the metro county.

When reviewing the data, one should note that the average percent for a county group was computed by summing the individual values of the given attribute divided by the sum of the total units in the group. It is an average of individuals located in that type of county. An alternative method would have been to sum the county average and divide by the number of counties. The method used here gives slightly more weight to larger counties.

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## HOUSING QUALITY

Traditionally housing quality has been described in terms of plumbing and crowding; in addition, presence of complete kitchen facilities is discussed here.

### Housing Lacking A Complete Bathroom

A larger proportion of nonmetro housing lacked complete plumbing (7.5 percent), than metro (3.2 percent)(Table 1). Houses lacking a complete bathroom were associated with rurality with the lowest proportion located in core counties of greater metro areas (2.4 percent) and the highest proportion in totally rural counties (10.3 percent). The more rural the counties the greater the chance that the houses would lack a complete bathroom.

### Crowded Housing

Along with housing with complete bathrooms, crowding (an average of over one person per room in the house) has commonly been used as a measure of inadequate housing. Housing in nonmetro counties was more crowded (4.3 percent) than in metro counties (3.5 percent) (Table 1). Although crowding is greater in nonmetro than in metro counties, the core counties of greater metro areas had about the same percent of crowding as the highest value in the nonmetro counties.

### Kitchen Facilities

Another variable used to describe housing quality is presence of complete kitchen facilities which is defined as units with all three of the following: (a) an installed sink with piped water, (b) a range or cook stove excluding portable cooking equipment, and (c) a mechanical refrigerator excluding ice boxes. Although these must be in the building or structure, they need not be all in the same room. Only 2.5 percent of all metro homes lack complete kitchen facilities compared with 5.9 percent of nonmetro homes. Furthermore, 8.4 percent of homes in the most rural counties have this problem.

### Age of Structure

Age of the housing unit is generally thought to relate to quality. Two measures of age of the stock are presented here: percent of housing units built before 1939 and percent of units built between 1970 and 1980. The latter is also a measure of household growth in an area.

Nonmetro counties had a larger proportion of older homes (those built 1939 or before) than metro counties (Table 1). Thirty-three percent of the homes in nonmetro counties were in this older category compared to only 23.4 percent for metro counties. As might be expected in counties where a relatively high proportion of houses were built in the seventies, a relatively low proportion had been built before 1940. Since 1940, house building in metro counties (outside the core) has exceeded that in nonmetro areas, resulting in a larger portion of new housing stock in these counties.

Table 1-Measures of housing quality

	:	:	:	:	:
	:	:	:	: Units	: Units
Metro and nonmetro urban orientation	: Lacking	: Crowded	: Without	: built	: built
	: complete	: with	: complete	: 1939 or	: 1970-
	: plumbing	: plumbing	: kitchen	: earlier	: 1980
	:	:	:	:	:
	:		—Percent—		
Metro:	:				
Greater (Core)	: 2.4	4.4	1.8	30.7	19.2
Greater (Fringe)	: 2.4	2.8	1.8	19.1	34.9
Medium	: 3.3	3.4	2.5	24.5	30.2
Small	: 3.9	3.7	3.0	23.2	30.3
Total metro	: 3.2	3.5	2.5	23.4	30.4
	:				
Nonmetro:	:				
Urbanized, adjacent	: 3.4	3.5	2.5	29.9	27.6
Urbanized, not adjacent	: 4.4	4.0	3.4	25.9	28.3
Less urbanized, adjacent	: 6.6	4.3	5.0	31.6	27.6
Less urbanized, not adjacent	: 6.7	4.3	5.1	32.6	26.7
Totally rural, adjacent	: 10.3	4.6	7.8	30.9	30.1
Totally rural, not adjacent	: 10.2	4.5	8.4	37.1	27.0
Total nonmetro	: 7.5	4.3	5.9	32.7	27.5
	:				

## HOUSING AFFORDABILITY

In order to understand the housing cost and affordability picture, average household income, and housing costs are examined as is percent of income spent on housing by owners and renters. It turns out that housing costs as a percent of income--often referred to as "affordability"--do not seem to be related to degree of rurality. Housing costs are much higher in urban areas, but so are incomes.

### Household Income

Average household income in metro counties was about one-fourth higher (\$21,424) than in nonmetro counties (\$16,966) (Table 2). With the exception of the core counties of greater metro areas, the more urban the counties the higher the income. Also, average household income in nonmetro counties adjacent to metro counties was higher than correspondent non-adjacent counties. Higher income was definitely associated with urbanity and lower income with rurality.

### Gross Rent

Gross rent in the various urbanized areas followed the household income trend for these same areas. The average gross rent in metro counties was 27.4 percent higher (\$265) than in nonmetro counties (\$208) (Table 2). By comparison, metro incomes are 26.3 percent higher than nonmetro incomes. And as with higher household income, higher gross rent was positively associated with urbanity. With the exception of greater metro core counties, the more urban the counties the higher the average rent. And except in the totally rural counties, higher rents were paid in counties adjacent to metro counties than were paid in the similar non-adjacent counties.

### Owners Costs (With Mortgage)

Owners monthly housing costs, including payments for mortgage, real estate taxes, property insurance, utilities, fuel and garbage collection, were 25.6 percent higher for metro counties (\$431) than for nonmetro counties (\$343) (Table 2). The percentage difference is similar to the the difference in household income (26.3 percent) and gross rent (27.4 percent) suggesting that average housing costs for owners and renters are highly correlated with income. Furthermore, the pattern is similar across county classifications to those discussed previously.

### Owner Costs (Without Mortgage)

Metro owner costs (without a mortgage) were 28.3 percent higher than nonmetro costs (Table 2). This was very similar to the metro increase in income, rent, and owner costs (with a mortgage). However, there was less difference between the highest and lowest owner costs without a mortgage (\$78) than for owner costs with a mortgage (\$179).



Table 2—Average household income and average housing costs, 1980

	:	:	Monthly average		
	:	:			
	:	Average			
Metro and nonmetro	:	household	Gross	Owner Cost	Owner cost with
urban orientation	:	income	rent	with mortgage	out mortgage <sup>1</sup>
	:	:	:	:	:
	:				
	:		—Dollars—		
Metro:	:				
Greater (Core)	:	21,153	270	447	157
Greater (Fringe)	:	25,749	305	489	190
Medium	:	20,327	247	397	145
Small	:	19,167	239	379	128
Total metro	:	21,424	265	431	154
	:				
Nonmetro:	:				
Urbanized, adjacent	:	18,385	227	368	135
Urbanized, not adjacent	:	17,576	218	355	121
Less urbanized, adjacent	:	16,875	199	335	117
Less urbanized, not adjacent	:	16,188	194	326	115
Totally rural, adjacent	:	15,846	188	328	113
Totally rural, not adjacent	:	14,935	190	310	112
Total nonmetro	:	16,966	208	343	120
	:				

<sup>1</sup> These owners own their homes free and clear.

### Percent of Income Spent on Housing

Percent of income spent on housing relates costs directly to income. Traditionally, it has been recommended that households spend no more than 25 percent of income on housing. Approximately 75 percent of all owners, regardless of location, spent 25 percent or less of income for housing (Table 3, Figure 1). However, renters were not as fortunate as a group. The percent of renters per classification which spent 25 percent or less of their income on housing ranged from 50.7 percent in core metro areas to 57.9 percent in totally rural areas.

Households spending 35 percent or more for housing definitely have affordability problems (Figure 2). While only 12.4 percent of all owners spend this much, 27.8 percent of all renters spend this much. Thus the biggest differences on percent of income spent on housing is between owners and renters not among locations.

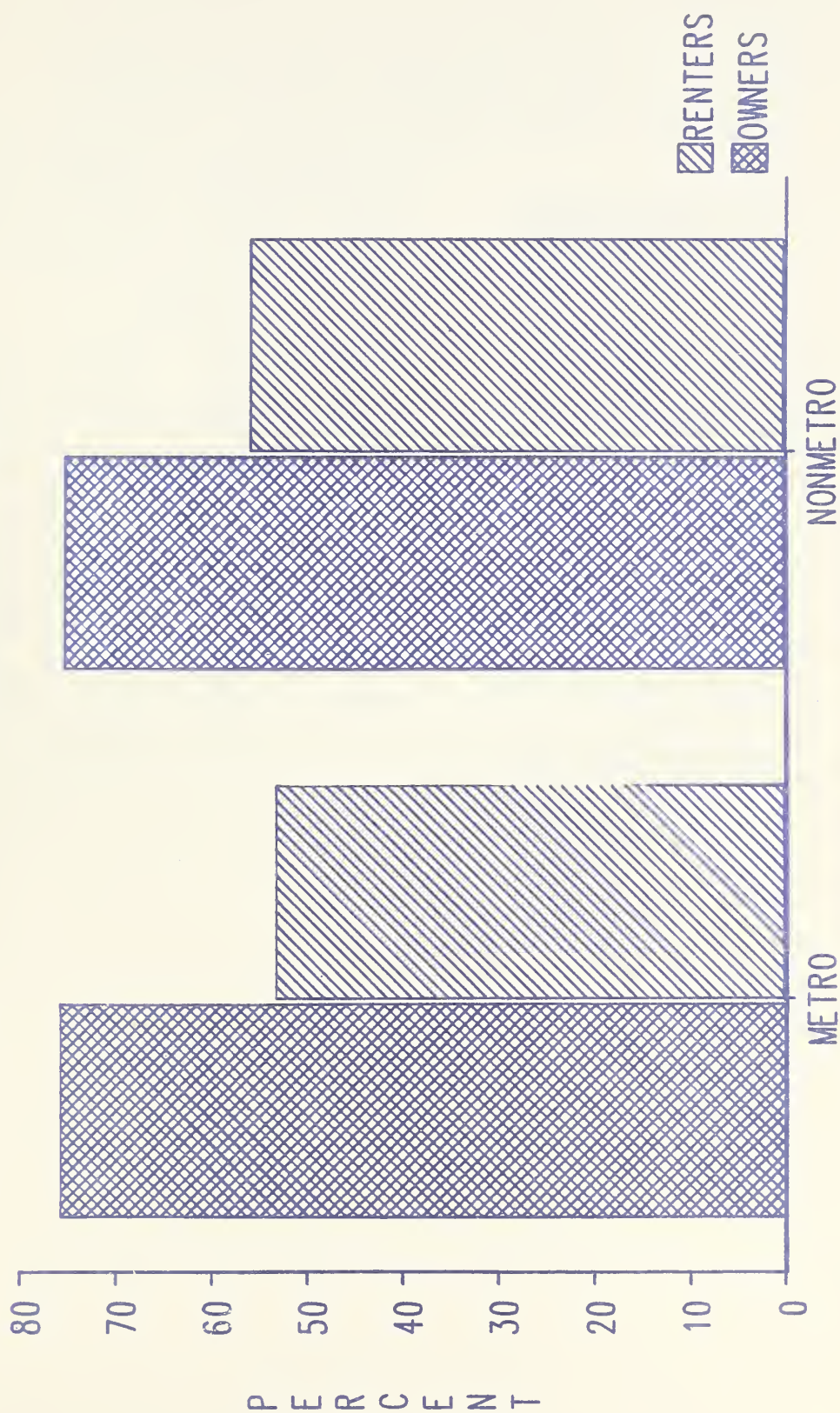
### SUMMARY

The analysis of housing variables presented here yields evidence that, except for greater metro core counties, the more rural the counties the lower the housing quality. Moving from the greater urban to the totally rural counties; housing activity slowed and fewer new homes were built as indicated by the proportion of homes built in the 1970's and before 1940; housing quality was lower as signified by the increased proportion of homes lacking a complete bathroom or that were crowded or lacked complete kitchen facilities. Despite these differences in quality, however, there was little difference in the proportion of their incomes people spent on housing across the rural-urban continuum. Although the more rural areas had lower household incomes, they also had lower rents and lower ownership costs. When percent of income spent on housing is analyzed, major differences exist between renters and owners but not by location.

Where does this lead us? First, there is still a need for programs directed toward improving housing quality in specific locations. Further renters, based on these 1980 data, are in greater need of assistance than owners. However, given the financing trends of the last three years, first time home buyers and households which move may also have problems.

Given that housing quality varies by location, one would expect the percent of income spent on housing to also vary. More research needs to be directed to this issue.

FIGURE 1—AVERAGE PERCENT OF INCOME SPENT ON HOUSING  
25 PERCENT OR LESS<sup>1</sup>



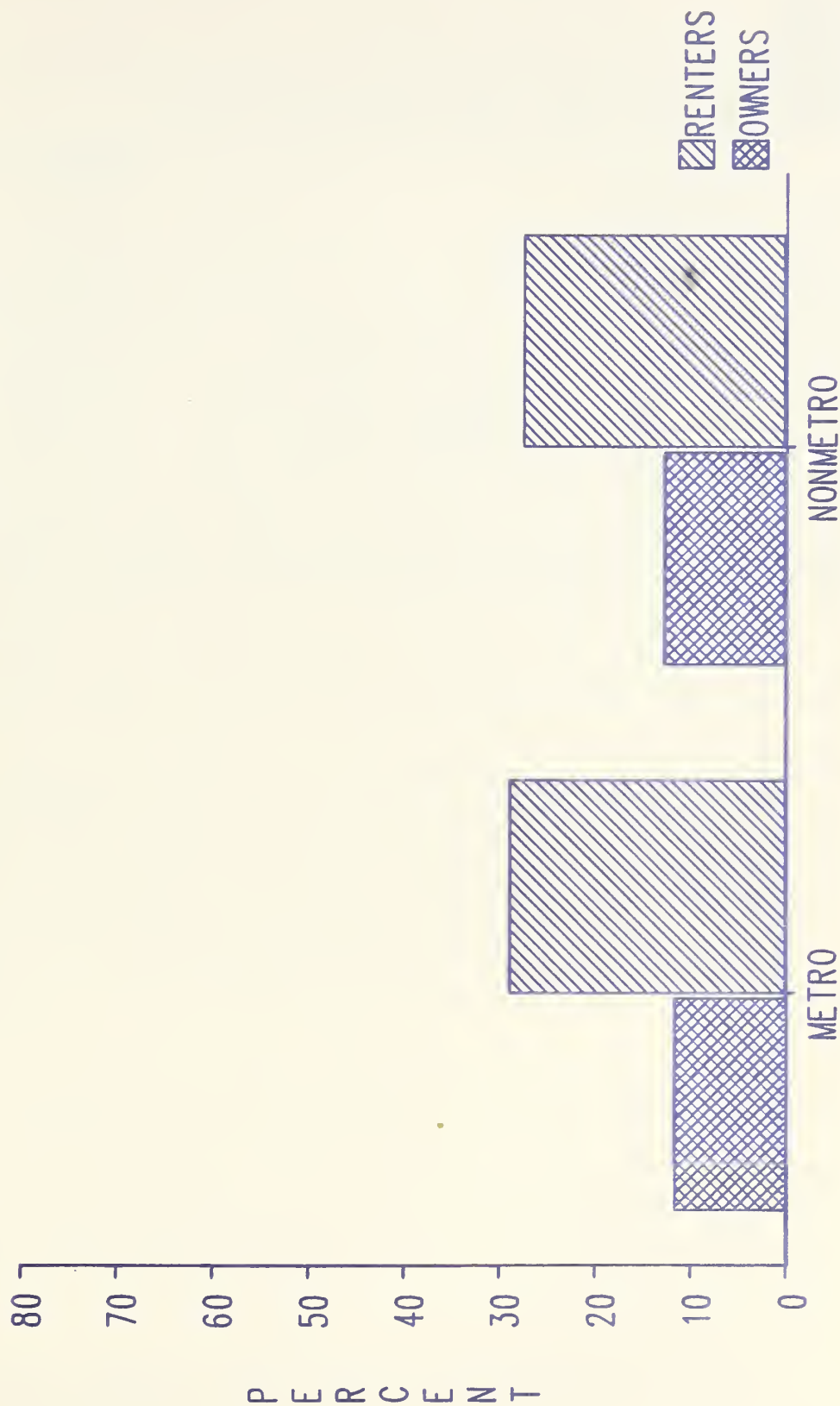
<sup>1</sup> Source: 1980 Census

Table 3—Average percent of income spent on housing

	:	:	:	:
	:	25 percent or less	:	35 percent or more
Metro and nonmetro urban orientation	:	Owners	:	Renters
	:	:	:	:
	:	—Percent—		
Metro:	:			
Greater (Core)	:	73.8	50.7	13.2
Greater (Fringe)	:	74.6	54.4	11.2
Medium	:	76.1	53.3	11.4
Small	:	76.6	52.8	11.4
Total metro	:	75.7	53.2	11.5
	:			
Nonmetro:	:			
Urbanized, adjacent	:	76.5	52.6	11.3
Urbanized, not adjacent	:	76.1	52.1	11.6
Less urbanized, adjacent	:	75.9	55.9	12.3
Less urbanized, not adjacent	:	75.4	55.4	12.5
Totally rural, adjacent	:	74.9	56.9	13.3
Totally rural, not adjacent	:	74.1	57.9	13.8
Total nonmetro	:	75.3	55.9	12.7
	:			



FIGURE 2—AVERAGE PERCENT OF INCOME SPENT ON HOUSING  
35 PERCENT OR MORE



<sup>1</sup> Source: 1980 Census

### Footnote

<sup>1</sup>The county classification was developed by Hines, Brown, and Zimmer and modified slightly by Beale. The classes are as follows:

<u>County Classification</u>	<u>Aggregate Urban Population</u>
Greater metro (core counties)	1 million or more
Greater metro (fringe counties)	1 million or more
Medium metro	250,000-999,999
Small metro	50,000-249,999
Urbanized nonmetro (adjacent to metro county)	20,000-49,999
Urbanized nonmetro (not adjacent to metro county)	20,000-49,999
Less urbanized nonmetro (adjacent to metro co.)	2,500-19,999
Less urbanized nonmetro (not adjacent to metro co.)	2,500-19,999
Totally rural nonmetro (adjacent to metro county)	Less than 2,500
Totally rural nonmetro (not adjacent to metro county)	Less than 2,500

Hines, Fred K., David L. Brown, and John M. Zimmer, Social and Economic Characteristics of Population in Metro and Nonmetro Counties, 1970 U.S. Department of Agriculture, Economic Research Service, AER 272 March 1975.

## TRANSPORTATION AND AGRICULTURAL EXPORT EXPANSION

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1984 Agricultural Outlook Conference, Session # 20  
Washington, D.C.

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The impact of transportation on agricultural export expansion covers a breadth of topics. Agricultural exports include a wide range of commodities, from bulk grains to canned goods and lumber. The transportation of these commodities can be accomplished with a variety of services and equipment. In addition, it is important to note that "export expansion" must be concerned with domestic as well as international transportation. Successful competition in world markets requires a total analysis of the movement to the loading port, the ocean leg of the journey, and the foreign movement from the discharge port to ultimate destination. Finally, a complete understanding of the impact of transportation on exports necessitates considering the total distribution system involved in the process of getting the product from origin to destination. Thus, one should include in this discussion not only transportation, but other logistical activities like storage and transfer operations, port facilities, and processing in route.

The logistics of agricultural exports is obviously a too complex and broad topic to be covered in such a small amount of time. Therefore necessity requires that the topic be limited. It is the intent of this presentation to focus on the domestic and international transportation issues concerned with the export expansion of agricultural commodities. Nevertheless, it is important to recognize that there is a much broader context to the issues that will be discussed.

There have been two main events that have shaped the current transportation environment for both domestic and world transportation systems. The first of these has been the prolonged economic recession here in the United States and throughout the world. This recession has been particularly devastating to the transportation industry and especially the ocean shipping segment. The second event, which has had an impact on the transportation environment,

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is the deregulation of domestic U.S. transportation with more open and competitive markets, along side of increased protectionism and governmental control of international transport. While domestically we go about the business of unraveling a century of federal regulation of the transportation system, the international community of nations is establishing a precedence for controlling access to trade by carriers.

#### The Domestic U.S. Environment:

Deregulation has undoubtedly been the main domestic transportation event of 1980's. With deregulation came a reallocation process within and between each of the modes. That process continues, although the end is probably in sight. Certainly by the middle of this decade we should begin to see an end to the chaotic pricing and service fluctuations that have typified the last few years. Once some stability has been achieved the industry should be much more competitive. For example, the nation's railroads are emerging stronger, healthier and more competitive than in the pre-Staggers Act era.

One of the key results of the readjustment now taking place will be transportation rates which more closely reflect the actual costs incurred in providing the service. However, the carriers new price flexibility has introduced some possible complications for shippers. The practice of contract rates has been introduced in the rail industry where shippers are now free to negotiate long term rate and service agreements with a specific line. More of this type of activity is expected in the future and should result in lower rates to those shippers who can generate the volume of movement that efficiently uses the rail's capital intensive plant and equipment. Carriers are also moving away from "value of service" pricing policies, with their inherent cross subsidization of commodities, towards more cost based rate systems. Such moves will mean increased rates on agricultural commodities that had previously enjoyed a hidden subsidy from higher valued manufactured products.

Changes in service are also a result of deregulation. For example, rail abandonment procedures have been expedited and relaxed. The current abandonments are especially hard on rural areas with little or sporadic traffic offerings. As a result, these areas can expect to pay higher transportation costs for alternative forms of moving their goods to market.



Another major issue impacting the domestic transportation system in this country is the public cost recovery policy that has been adopted during the past few years. User taxes seem to now be an accepted political fact in all sectors of the economy. In transportation, the heaviest readjustment falls on the inland river and port system. The recovery of costs associated with lock construction, channel maintenance, port dredging and Coast Guard services will all add to the price of waterborne agricultural movements. Also, If there is some validity to the argument that barge rates place a ceiling on competitive rail rates, then one could also expect an increase in that mode as well.

It is apparent that deregulation, with its attendant competitive markets, and the public cost recovery policy will impact the price of transportation services in this country. In all probability, deregulation will result in somewhat lower rates overall, but higher prices to those shippers whose commodities were beneficiaries of cross subsidies under regulation. The cost recovery policies will undoubtedly raise prices as these previously government subsidized expenses are now passed along to carriers and ultimately shippers and consumers.

For those who recall the days of rail car shortages and limited barge capacity for grain movements one might ask about the prospects for a return to that earlier situation. At present, the recession has solved the capacity problem. All indications are that the current large surplus of hopper cars and barges will continue throughout 1984. Even with faster economic growth than is now envisioned by most forecasts, there does not appear to be any real capacity problems in the domestic transportation system, especially for dry bulk shippers.

Finally, any discussion of the current domestic situation would be remiss if mention was not made of the trend toward intermodal ownership and the "transportation" company. The idea that a single firm should be able to offer a complete selection of modal choices to a shipper, all under one roof, has been long debated in transportation circles. It now appears that, at least regulatory commission acceptance of the concept is developing. How the courts will respond to the obvious challenges that will arise, is too early to determine. However, it is an area that those involved in agricultural shipments must keep an eye on for protection of their own interests. The current merger activity involves joint rail and barge ownership, both of which are major movers of agricultural exports.

## The International Environment:

Overcapacity and depressed rates has been the picture facing the international shipping industry in recent years. The worldwide recession has been particularly hard on dry bulk shipping. As the following table indicates, grain rates for voyage charters have fallen to record lows. In 1979 the average rate on the U.S. Gulf to Holland route was \$13.27, raising to \$17.68 in 1980. By the first quarter of 1981 it had peaked at \$19.35. Current rates on this same route stand at \$7.00, which is about 50 percent of the 1979 rates and almost two-thirds less than the 1981 peak.

Table 1  
Grain Voyage Charter Rates

Year	Rate A	Rate B
1979	\$13.27	\$21.52
1980	17.68	27.81
1981	19.35	29.76
1983	7.00	15.20

Note: Rate A is U.S. Gulf to Holland  
Rate B is U.S. Gulf to Japan  
1979, 1980 are annual averages  
1981 is first quarter average  
1983 is October quotes

In 1979 there was 182 million DWT of bulk shipping capacity in world trade. By 1982, 23 million tons of dry bulk capacity was laid up or inactive. However, during that same year an additional 13 million tons of new capacity was added to the world fleet. In fact, as of July 1983, there are 834 vessels on order in world shipyards, some 38 million tons of still additional capacity to be delivered in the next two or three years.

While most experts believe that rates have bottomed out, there is little optimism on the part of owners for any substantial increases in the near future. Current levels, for both voyage and time charters are barely covering operating costs.

Of lesser direct impact than the excess capacity and depressed rates is the increased tendency of nations to reserve part of their trade to ships of their own registry. This trend was highlighted by the implementation of the UNCTAD Code of Conduct for Liner Conferences in October, 1983. While this code only applies to liner traffic,

and then only to conference controlled trade, it is certainly a portent of things to come. Already its cargo reservation scheme of at least 40 percent of a nation's liner trade for home country vessels is being adopted as a prototype for all trade by some countries. Nations which have now imposed, unilaterally or bilaterally, strict trading requirements include the Philippines, Nigeria, Venezuela, Libya, India and Peru.

The United States has refused to join the code, even with the so-called Brussels package. But, pressures will remain to protect our own trades through bilateral agreements with those countries who insist on some type of cargo sharing arrangement. Debate on the issue continues in congress, with HR 1242 "The Competitive Shipping and Shipbuilding Act" serving as the focus with its intent to provide cargo reservations in the U.S. bulk trades. The long run prognosis is for a shipping industry controlled by cargo sharing rules. If this happens shippers can expect higher rates and deteriorating service.

Along similar lines to the cargo reservation policies of many countries is the rise of national ownership. On world markets, both the communist nations and the LDC's have been adding government controlled tonnage. In 1982 the tonnage under LDC control increased by 1 percent, while that of the OECD nations decreased by 1 percent. It is anticipated that by the mid 1990's the LDC nations will have achieved a 20 percent share of world shipping capacity.

The short term effect of both cargo reservation and nationalized fleets will probably mean continued depressed rates in most trades. This is due to the fact that with surplus capacity those newly built fleets will compete at rates that barely cover operating costs, and in some cases may even drop below operating costs to subsidize their fledgling industry. If the long term result is to drive the private capitalistic carriers out of the market then one can probably expect higher rates, in excess of full costs, especially in restricted trades. In those trades the shipper will have no alternative but to pay the price or have his products locked out of the market.

## Conclusions:

What are the impacts of these domestic and international trends on the ability of agricultural exports to compete effectively on world markets? Most of the effects can be translated into either service or price implications for the coming year.

In the area of service, the capacity of both the domestic and international transportation system should be more than adequate. There now exists a surplus of both rail and barge equipment domestically. International dry bulk shipping is awash in excess tonnage. Even with the expected recovery of the U.S. and world economies there is no prospect of a shortage of equipment during 1984.

Prices domestically should increase slightly during 1984, although the rise will be gradual and reflect the growth of the economy and current less than cost rates, rather than a response to any shortages or bottlenecks in the system. Some of these increases may well be offset by contract rates where shippers have sufficient movements to justify lower volume related prices.

Prices internationally will continue to remain at the current extremely depressed levels on most trade routes. With a large and growing surplus of tonnage and no large increase projected for demand, there is no reason to expect that the market will respond in any other way.

From all indications, 1984 will remain a buyer's market for those seeking transportation service. For the shipper of agricultural commodities and products, these are bargain basement times.



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## INTRODUCTION

Prospects for improved world consumption coupled with marginal declines in world production are expected to significantly lower world stocks. Despite these encouraging signals cotton trade prospects for 1983/84 remain unfavorable as nearly all of the estimated increase in consumption is expected to occur in China, the Soviet Union, Pakistan, and India -- countries which are now virtually self sufficient in cotton production. Moreover, countries, such as China and Pakistan are beginning to significantly increase exports of yarn to traditionally large raw cotton importing markets thus dampening U.S. sales prospects.

## WORLD COTTON OUTLOOK

### Production

Foreign cotton production has made steady gains in recent years showing an uninterrupted rise from 49.1 million bales in 1978/79 to 59.1 million this season. Individual countries have recorded varying track records. Chinese production made the largest gains. Others making substantial gains have been Australia, the Soviet Union, Pakistan, Sudan, India and Brazil. Egypt increased less and Mexico has actually declined in production since 1978. Currently, China, the Soviet Union, India and Pakistan account for 69 percent of all 1983/84 foreign cotton production. All show production increases over 1982/83 and account for almost all the 1983/84 increase in foreign mill use. World production is down this season due largely to the U.S. PIK program and unfavorable weather in parts of the U.S. cotton belt.

### Consumption

Reflecting a continued gradual recovery in the world economy and renewed demand for textile products, world cotton consumption in 1983/84 is projected at 69.6 million bales, an increase of nearly two million from last season. Slightly over 80 percent of this increase is forecast to occur in China, the United States, the Soviet Union, Pakistan, and India. Each of these countries, however, is virtually self sufficient in cotton production, thus constraining the growth of world trade in 1983/84. In contrast, prospects for increased consumption in the major importing countries of Asia remain generally flat in light of high raw cotton prices, increasing competition from manmade fibers, and fierce competition in world markets from low-cost textile producing countries such as Pakistan and China.

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Cotton consumption in China has grown dramatically over the last 10 years and now accounts for about one quarter of world consumption. In 1983/84, Chinese consumption is expected to reach 17.2 million bales, up 700,000 from last season's level. The increase in use is attributable to strong domestic demand for cotton yarn, continued expansion of mill capacity, and aggressive overseas marketing of textile products. Bolstered by strong signs of economic recovery, U.S. consumption in 1983/84 is forecast at nearly 6 million bales, a gain of 462,000 from last season's level. In the Soviet Union, cotton production is expected to recover in 1983/84 from the low level of the past season, thereby increasing supplies available for domestic consumption. Consequently, Soviet consumption is estimated at about 9.4 million bales, an increase of 150,000 from last year.

Substantial increases in consumption are also projected for Pakistan and India. Facing strong export and domestic demand for textile products, Pakistani consumption is expected to reach 2.5 million bales, up 150,000 from 1982/83. In recent years Pakistan has followed the example of other major cotton producing countries such as Turkey and Greece who increasingly emphasize the export of textile goods as opposed to exports of raw cotton. In India, consumption is estimated at about 6.5 million bales, an increase of 200,000 from last year. The increase in use is attributable to the resumption of work in the previously strike-affected textile mills in the Bombay area, the expansion of domestic mill capacity, and an increase in the duty on imported manmade fibers.

The outlook for consumption in the major Asian markets in 1983/84 remains mixed. In Japan, use is expected to drop slightly below last year's level of about 3.3 million bales. Although Japanese spinners have continued their efforts to curb yarn production, stocks of cotton textile products remain higher than normal. In addition, higher raw cotton prices, increasing competition from manmade fibers, and substantial imports of low-priced cotton yarn and fabrics from Pakistan and South Korea have contributed to reduced mill demand for raw cotton.

In South Korea, consumption in the latter half of the 1982/83 season rebounded strongly as a result of improved domestic and foreign demand for textile products. Although textile stocks are currently below normal, mills are making increasing use of low-priced Korean and Japanese polyester fiber. Consequently, consumption in 1983/84 is forecast to increase only modestly to 1.6 million bales, a gain of 30,000. In Taiwan, consumption is estimated at 1.1 million bales, unchanged from last year. Although still well below the level of past years, consumption in Hong Kong's textile industry has recently picked up and is now estimated at 700,000 bales. The increase in use is attributable to strong export demand in the first half of 1983 and sharply reduced domestic stocks of textile products. Rising production costs, a weakening Hong Kong dollar, and substantial imports of yarn from China continue, however, to trouble Hong Kong's textile industry.

## Trade

World cotton trade levels have been sharply influenced in recent years by 1/ very large Chinese purchases which in turn have been replaced through domestic production increases and 2/ Soviet exports which dropped sharply during 1982/83 because of a weather damaged crop but averaged 4.0 million bales during 1978/79-1981/82.

World cotton imports (excluding China) have stagnated in recent years averaging 17.9 million bales in 1978/79-1982/83, the same level estimated this season. During this period no major importers (excluding China) have shown any significant trend in import trade. Several factors are involved here. The recent recession has of course dampened demand for textile products, but importantly these major cotton importing markets - Japan, South Korea, Taiwan, Hong Kong and Western Europe (over 60 percent of 1983/84 world imports) have been facing increasing competition in their textile and yarn exports from cotton producing countries. China, Pakistan, Greece, Turkey and India are consuming more raw cotton at home and pushing exports of higher valued yarn and textiles. The current 1983/84 outlook shows Japan continuing the voluntary restraint in yarn production. Japanese imports are projected slightly above last year but below pre-1982/83 levels. South Korea, Taiwan and Hong Kong imports may also be slightly higher in 1983/84, but these gains are offset by expected declines in Western Europe. Total world imports are forecast at 18.2 million.

World cotton exports have ranged from 18 - 23 million bales in recent years. The range narrows, however, if exports to China are omitted and becomes a 17 - 19 million range with exports showing the same stagnant pattern as we saw in the import figures. During the current 1983/84 season world exports are forecast at 18.4 million bales. Larger 1983/84 exports are likely for the Soviet Union, Sudan, Turkey, Guatemala, Argentina and the United States, but lower for Brazil, Peru, Egypt, India and Mexico.

## Stocks

World cotton carryover in 1983/84 is estimated at 24.8 million bales, a decrease of 3.2 million from the 1982/83 level. In the United States, its effect of acreage reduction programs combined with adverse weather is expected to lower ending stocks by about 3.5 million bales to 4.4 million. Foreign ending stocks, however, are forecast to increase by 300,000 bales. In the Soviet Union and the Sudan, ending stocks are expected to increase by 500,000 bales and 140,000 bales, respectively, largely due to improved production prospects.

## Prices

World cotton prices rose steadily for the first 8 months of 1983 before a modest seasonal decline in September. The Northern European "A" Index averaged about 89 cents per pound in late September compared with the year earlier average monthly quote of about 73 cents.



The combined impact of a government announced PIK program, an improving world economy and prospects of restricted exportable supplies spurred the international price movement out of the depressed 1982 level.

On the other hand, as world cotton prices began to climb polyester prices were beginning to sag. In October 1982, the mill delivered price in the UK for polyester fibre was 76 cents compared to the average cotton CIF price of 71 cents. Recent price situations have reversed themselves. Delivered mill price to the UK for polyester fiber is about 66 cents while CIF cotton is about 88 cents. Depressed oil prices coupled with reduced cotton supply prospects have contributed to cotton's loss of competitive advantage over the period.

Although international quotes for Memphis Territory and California/Arizona cotton shadowed the "A" Index during 1983, a divergence began to appear in May between U.S. quotations which widened sharply by the end of summer. Throughout the fall of 1982 and early 1983 there was no more than a 75 points difference between Delta and Southwestern cotton. By September the average quote for Memphis Territory cotton was 88.15 cents per pound while California/Arizona growths were 91.45 cents per pound. The shortage of better quality cotton in world markets, as well as the U.S., contributed significantly to this 330 point spread.

#### Outlook 1984/85

Recent trends in world cotton production and mill use suggest a broad outline of 1984/85 prospects. Foreign plantings have been increasing slightly and trends indicate 1984/85 foreign production may exceed the record 59.1 million bale crop this season. Area planted in China, the Soviet Union and Turkey may approximate current levels. The EC Common Agricultural Policy for Cotton is expected to hold Greek cotton areas at current levels. Intensified production research and a continued high level of investment may boost Australian cotton slightly and Mexico should rebound somewhat from the short 1982/83 and 1983/84 crops. World mill use should reflect improving world economic conditions registering moderate gains in Asia, Europe and the Western Hemisphere.



TABLE 1 COTTON: WORLD STOCKS, PRODUCTION,  
EXPORTS, AND CONSUMPTION BY AREA 1/  
1977/78 - 83/84 (1000 400 LB BALES)

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83 PRELIMINARY	1983/84 ESTIMATE	1984/85 FORECAST
<b>BEGINNING STOCK:</b>								
EXPORT NATIONS								
US	10902	14326	12131	11693	11293	15319	16065	13330
USSR	2928	5347	3958	3000	2668	6632	7937	4372
IMPORT NATIONS	2040	1995	1850	2402	2785	2675	2475	2975
PRC	9964	11579	12048	12514	12243	12399	11993	11495
PRC	2800	2700	3000	3590	4240	4240	4640	4540
FOREIGN TOTAL	17938	20558	20221	21207	20868	21586	20121	20453
WORLD TOTAL 2/	20866	25905	24179	24207	23536	28218	28050	24825
<b>PRODUCTION:</b>								
EXPORT NATIONS								
US	46922	41832	47388	44096	48612	42753	41036	0
USSR	14389	10856	14629	11122	15646	11963	7550	0
IMPORT NATIONS	12710	12257	13126	13500	13275	11900	13500	0
PRC	17227	18167	18094	20673	22117	24745	25656	0
PRC	9400	9950	10100	12400	13600	16500	17000	0
FOREIGN TOTAL	49760	49143	50853	53647	55083	55535	59142	0
WORLD TOTAL 2/	64149	59999	65482	64769	70729	67498	66692	0
<b>CONSUMPTION: 3/</b>								
EXPORT NATIONS								
US	25425	25711	25992	25494	25011	25774	26555	0
USSR	6509	6352	6506	5891	5264	5513	5975	0
IMPORT NATIONS	8950	9000	9100	9200	9200	9200	9350	0
PRC	34240	36236	39348	40515	40627	41823	43002	0
PRC	11000	11800	13500	15300	15700	16500	17200	0
FOREIGN TOTAL	53156	55595	58034	60118	60374	62084	63582	0
WORLD TOTAL 2/	59665	61947	65340	66009	65638	67597	69557	0
<b>EXPORTS:</b>								
EXPORT NATIONS								
US	18433	19056	22202	18729	19244	17149	17444	0
USSR	5484	6100	9229	5926	6567	5207	5275	0
IMPORT NATIONS	4160	3756	3770	4070	4295	3300	3800	0
PRC	707	700	897	923	795	1067	985	0
PRC	100	50	0	0	0	100	200	0
FOREIGN TOTAL	13656	13576	13870	13726	13472	13009	13154	0
WORLD TOTAL 2/	19140	19756	23099	19652	20039	18216	18429	0

1/ SEASON BEGINNING AUGUST 1.  
2/ EXCLUDES COTTON AFLOAT, IN TRANSIT, AND IN FREE PORTS  
3/ DOES NOT INCLUDE DESTROYED OR UNACCOUNTED.  
4/ INCLUDES SMALL QUANTITIES REEXPORTED. FOREIGN TOTAL IS ACTUAL WORLD TOTAL MINUS UNITED STATES  
FAS TOBACCO, COTTON, AND SEEDS DIVISION, CF

TABLE 2

AREA, YIELD, AND PRODUCTION WORLD AND SELECTED COUNTRIES AND REGIONS  
(1,000 HA, 1,000 BALES AND KG/HA)

CONTINENT AND COUNTRY	AREA			YIELD			PRODUCTION		
	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84
	1,000 Hectares			KG/HA			1,000 Bales		
<b>WESTERN HEMISPHERE:</b>									
UNITED STATES	5,601	3,937	3,011	608	662	546	15,646	11,963	7,550
BRAZIL	2,070	2,125	2,035	312	308	294	2,962	3,008	2,750
MEXICO	350	204	240	885	886	871	1,422	830	960
ARGENTINA	399	360	520	383	319	327	701	528	780
PARAGUAY	270	275	275	333	269	364	413	340	460
NICARAGUA	93	90	104	663	866	785	283	358	375
PERU	126	83	103	747	388	705	432	148	340
GUATEMALA	77	49	60	1,049	933	1,197	371	210	330
COLOMBIA	149	58	86	590	601	610	404	160	241
EL SALVADOR	53	50	53	781	806	781	190	185	190
VENEZUELA	13	45	45	419	353	353	25	73	73
HONDURAS	8	5	7	789	653	653	29	15	21
ECUADOR	22	17	6	643	589	508	65	46	14
BOLIVIA	8	8	5	490	218	435	18	8	10
OTHERS	23	22	22	227	257	257	24	26	26
<b>TOTAL.....</b>	<b>9,262</b>	<b>7,328</b>	<b>6,574</b>	<b>540</b>	<b>532</b>	<b>468</b>	<b>22,985</b>	<b>17,898</b>	<b>14,120</b>
<b>EUROPE:</b>									
GREECE	126	140	168	954	715	803	552	460	620
SPAIN	72	51	34	977	948	897	323	222	140
BULGARIA	13	13	13	335	335	335	20	20	20
YUGOSLAVIA	2	3	3	218	290	290	2	4	4
ITALY	3	3	3	218	218	218	3	3	3
OTHERS	28	28	28	272	272	272	35	35	35
<b>TOTAL.....</b>	<b>244</b>	<b>238</b>	<b>249</b>	<b>834</b>	<b>681</b>	<b>719</b>	<b>935</b>	<b>744</b>	<b>822</b>
<b>AFRICA:</b>									
EGYPT	495	488	425	1,008	944	1,076	2,292	2,117	2,100
SUDAN	353	424	500	433	449	435	706	875	1,000
ZIMBABWE	116	138	144	482	413	491	257	262	325
SOUTH AFRICA	108	105	110	333	270	495	165	130	250
TANZANIA	395	375	355	113	106	104	205	183	170
CHAD	190	137	135	138	275	274	120	173	170
CAMEROON	65	55	55	399	519	515	119	131	130
NIGERIA	215	205	200	96	133	133	95	125	122
UGANDA	249	674	675	33	24	32	38	75	100
KENYA	121	145	145	67	90	90	37	60	60
MOZAMBIQUE	110	110	110	138	109	109	70	55	55
ZAIRE	200	200	200	54	54	54	50	50	50
CENTRAL AFRICAN	52	68	70	121	150	146	29	47	47
MALAWI	35	35	35	218	218	218	35	35	35
MOROCCO	11	10	11	554	631	495	28	29	25
ANGOLA	25	25	25	174	174	174	20	20	20
SOMALIA	12	12	12	127	127	127	7	7	7
OTHERS	613	581	596	285	383	354	802	1,021	968
<b>TOTAL.....</b>	<b>3,367</b>	<b>3,787</b>	<b>3,803</b>	<b>328</b>	<b>310</b>	<b>323</b>	<b>5,075</b>	<b>5,395</b>	<b>5,634</b>
<b>ASIA AND OCEANIA:<sup>1/</sup></b>									
CHINA	5,185	5,828	5,850	571	616	333	13,600	16,500	17,000
USSR	3,168	3,188	3,220	912	813	913	13,275	11,900	13,500
INDIA	7,987	7,950	8,000	174	173	177	6,400	6,324	6,500
PAKISTAN	2,215	2,260	2,260	343	365	376	3,494	3,790	3,900
TURKEY	654	595	615	744	820	814	2,241	2,241	2,300
SYRIA	143	159	160	906	972	973	595	710	715
AUSTRALIA	103	101	120	1,306	1,024	1,270	618	475	700
IRAN	195	205	200	363	454	435	325	427	400
ISRAEL	64	60	56	1,432	1,444	1,419	421	398	365
THAILAND	151	110	120	388	370	363	269	187	200
BURMA	237	248	225	160	162	179	174	185	185
AFGHANISTAN	50	50	50	435	435	435	100	100	100
IRAQ	65	65	65	218	218	218	65	65	65
PHILIPPINES	15	10	13	348	457	503	24	21	30
SOUTHERN YEMEN	16	16	16	340	340	340	25	25	25
KOREA, REPUBLIC	5	4	4	305	327	272	7	6	5
OTHERS	91	109	126	242	214	218	101	107	126
<b>TOTAL.....</b>	<b>20,344</b>	<b>20,958</b>	<b>21,100</b>	<b>447</b>	<b>452</b>	<b>476</b>	<b>41,734</b>	<b>43,461</b>	<b>46,116</b>
<b>FOREIGN TOTAL.....</b>	<b>27,616</b>	<b>28,374</b>	<b>28,713</b>	<b>434</b>	<b>418</b>	<b>448</b>	<b>51,083</b>	<b>55,533</b>	<b>59,142</b>
<b>WORLD TOTAL.....</b>	<b>33,217</b>	<b>32,311</b>	<b>31,726</b>	<b>464</b>	<b>455</b>	<b>458</b>	<b>70,729</b>	<b>67,498</b>	<b>66,692</b>

<sup>1/</sup> Includes Middle Eastern cotton producing countries.

NOTE: Totals may not add because of rounding.

-- Denotes not available, unknown, or not applicable.

Harvest season beginning August 1.

Bales of 480 lb. net.

SOURCE: Prepared or estimated on the basis of official statistics of foreign governments, other foreign source materials, reports of U.S. agricultural attaches and foreign service officers, results of office research and related information.

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POSITION PRODUCTION ESTIMATES DIVISION, FAS, USDA

TABLE 3

U.S. COTTON: EXPORTS BY COUNTRY OF DESTINATION  
(In Thousand of 480 pound bales)

Destination	MARKETING YEAR				
	Average 1976-80	1981	1982	August 1982	1983
<b>Asia &amp; Oceania:</b>					
Bangladesh.....	77	50	88	0	1/
China Mainland.....	947	847	20	1	0
China, Taiwan.....	499	777	378	27	21
Hong Kong.....	430	243	158	24	8
Indonesia.....	241	286	268	25	23
Japan.....	1,233	1,626	1,286	87	132
Korea, Republic of.....	1,251	1,412	1,322	105	85
Malaysia.....	46	53	30	3	2
Philippines.....	110	58	72	3	3
Singapore.....	25	16	13	1	1/
Thailand.....	211	167	197	18	11
Other Asia & Oceania.....	68	5	3	0	2
<b>Total.....</b>	<b>5,138</b>	<b>5,540</b>	<b>3,835</b>	<b>294</b>	<b>287</b>
<b>Europe:</b>					
Belgium.....	15	35	12	1	1/
France.....	66	58	45	2	2
Germany, Federal Republic of.....	104	119	163	5	3
Greece.....	57	117	109	5	0
Italy.....	111	106	105	7	6
Netherlands.....	13	2	7	1/	0
United Kingdom.....	62	43	50	1	6
Other EC.....	26	58	68	4	6
<b>Subtotal.....</b>	<b>454</b>	<b>538</b>	<b>559</b>	<b>25</b>	<b>23</b>
Finland.....	10	12	9	1	1/
Norway.....	5	7	10	1	1
Poland.....	36	1	0	0	0
Portugal.....	53	54	40	2	1
Romania.....	46	0	0	0	0
Spain.....	83	57	72	3	4
Sweden.....	19	17	23	2	1
Switzerland.....	89	85	53	2	1
USSR.....	1/	0	192	0	13
Yugoslavia.....	1	0	112	0	33
Other Europe.....	3	13	0	0	1
<b>Total Europe.....</b>	<b>799</b>	<b>784</b>	<b>1,070</b>	<b>36</b>	<b>78</b>
<b>Western Hemisphere:</b>					
Canada.....	235	167	238	17	26
Chile.....	3	--	--	1/	1/
Colombia.....	10	0	9	9	0
Other Western Hemisphere.....	13	5	6	1	8
<b>Total.....</b>	<b>261</b>	<b>172</b>	<b>253</b>	<b>27</b>	<b>34</b>
<b>Africa &amp; Middle East:</b>					
Egypt.....	56	0	0	0	0
Ghana.....	16	3	6	0	0
Morocco.....	21	24	27	2	3
Other Africa & Middle East.....	30	44	16	1	1
<b>Total.....</b>	<b>123</b>	<b>71</b>	<b>49</b>	<b>3</b>	<b>4</b>
<b>Grand total.....</b>	<b>6,321</b>	<b>6,567</b>	<b>5,207</b>	<b>360</b>	<b>403</b>
<b>Grand total (running bales).....</b>	<b>6,010</b>	<b>6,249</b>	<b>4,959</b>	<b>342</b>	<b>383</b>
<b>Total value (Mil of dol).....</b>	<b>2,078</b>	<b>2,097</b>	<b>1,532</b>	<b>109</b>	<b>137</b>

1/ Less than 500 bales.

SOURCE: Compiled from data received from the U.S. Bureau of Census.

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TABLE 4

NORTHERN EUROPEAN C.I.F. QUOTATIONS FOR U.S. M 1 3/32" COTTON  
 COMPARED WITH "COTTON OUTLOOK: 'A' INDEX FOR M 1 3/32"  
 COTTONS (CENTS PER POUND)

DATE	OUTLOOK INDEX	U.S. MIDD 1-3/32		U.S. QUOTATIONS MINUS INDEX "A"	
1982/83	"A"1/	Memphis	California	Memphis	California
		Territory	Arizona	Territory	Arizona
<u>Yearly Average</u>					
1981/82.....	73.76	75.89	76.07	+2.13	+2.31
1982/83.....	76.65	77.95	78.68	+1.30	+2.03
<u>Monthly Averages</u>					
June.....	86.01	85.05	86.55	-.96	+.54
July.....	88.44	88.06	90.69	-.38	+2.25
August.....	90.80	88.94	91.88	-1.86	+1.08
September.....	89.85	88.15	91.45	-1.70	+1.60
<u>Weekly Quotations</u>					
June 2.....	84.15	82.75	84.25	-1.40	+.10
June 9.....	85.05	84.25	85.75	-.80	+.70
June 16.....	84.75	83.25	84.75	-1.50	0
June 23.....	87.90	87.25	88.75	-.65	+.85
June 30.....	88.20	87.75	89.25	-.45	+1.05
July 7.....	88.70	89.50	92.00	+.80	+3.30
July 14.....	88.00	87.25	90.25	-.75	+2.25
July 21.....	87.80	86.75	89.00	-1.05	+1.20
July 28.....	89.25	88.75	91.50	-.50	+2.25
August 4.....	90.15	89.00	91.75	-1.15	+1.60
August 11.....	90.80	88.50	91.50	-2.30	+.70
August 18.....	90.85	88.75	91.75	-2.10	+.90
August 25.....	91.40	89.50	92.50	-1.90	+1.10
September 1.....	92.15	90.50	94.00	-1.65	+1.85
September 8.....	91.95	90.00	93.50	-1.95	+1.55
September 15.....	89.10	86.75	90.25	-2.35	+1.15
September 22.....	89.05	88.00	91.00	-1.05	+1.95
September 29.....	87.00	85.50	88.50	-1.50	+1.50

1/ The "A" Index is the average of 5 lowest prices of the following 10 descriptions all M 1 3/32" (except as noted): Memphis Terr.; Calif.-Ariz.; Mexico, Sin-Son; Guate. Syria; Turkey; Izmir I RG; Greece: USSR; Vtoroi: Tanzania, "AR" Mwanza No.1. Courtesy Liverpool Cotton Services. In August 1981 Index "A" was changed from SM 1-1/16 to M 1-3/32". 2/ Calculated using spot market quote plus shipping cost. N = Nominal. NQ = Not Quoted.



Terry Townsend, Economic Research Service, USDA

1984 Agricultural Outlook Conference, Session #21  
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The Department of Agriculture has already announced the 1984 cotton program, and supply and use estimates for the 1983/84 season have been available for several months now. I would like to use this time today to explain the logic behind USDA's supply and use forecasts for this season and next, and to present some of the implications of those forecasts.

Projections for 1984/85, especially, will be imprecise, but several conclusions are apparent, despite the wide range of possible error around each estimate. For instance, while U.S. cotton prices are higher and the supply lower this year than in the past 2, the outlook for next season is that supply will likely become more abundant. Also, while domestic demand in the United States, a measure which includes the textile trade deficit, has strengthened over the past 2 years, growth in the textile trade deficit is limiting the recovery in U.S. mill use. Further, better weather and higher world cotton prices are encouraging increased foreign cotton production. Consequently, U.S. exports will show little growth this year and may even decline next year.

#### Domestic Demand and Mill Use

Domestic consumption of cotton at seasonally adjusted annual rates has been rising for over 1-1/2 years as shown in figure 1. Domestic consumption is calculated by adding cotton textile imports, on a raw fiber equivalent basis, to U.S. mill use and subtracting cotton textile exports. This measure reached a low-point in January, 1982 and began recovering before the rest of the economy. Domestic consumption reached a seasonally adjusted annual rate of over 8 million bales in August, 1983 but for the entire 1983/84 season is expected to average less than the August rate.

There are 3 principal reasons for increased consumption of cotton in the United States. These include rising incomes, changing consumer tastes, and increased cotton textile imports. We are all aware of the rising income argument. During 1983, real disposable per capita personal income has grown by about 3.5 percent. When accompanied by improvements in consumer confidence and lower interest rates, increased income has encouraged greater consumer spending. During the 3 months ending in September, seasonally adjusted retail sales by apparel and accessory stores, deflated by the consumer price index for apparel and upkeep, were about 3.4 percent higher than during the first 3 months of the year.

60th ANNUAL AGRICULTURAL OUTLOOK CONFERENCE • USDA

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Stronger consumer demand for cotton in apparel is another reason for the stronger domestic consumption figures. Cotton's share of the retail apparel market increased from 38 percent in the second quarter of 1982 to 39 percent during the same quarter of 1983. Men's shirts, sweaters, underwear, and socks are some of the products in which the use of cotton seems to be increasing. These changes in tastes help to explain why domestic consumption began to increase before the economic recovery began.

The third reason I cited for increased cotton consumption in the United States is increased textile imports. I realize that this is a controversial statement, but I believe it is true. Foreign mills use a higher percentage of cotton than do domestic mills. In 1982, the cotton share of all U.S. textile imports, on a raw fiber equivalent basis, was about 52 percent, compared to cotton's share of U.S. mill use of about 24.5 percent. The cotton textile trade deficit has grown from about 900,000 bales in 1980/81, to about 1.7 million bales in 1982/83, and as cotton has become more available at the retail level, domestic consumption has risen.

Mill use has not improved as fast as domestic consumption, although it did reach a seasonally adjusted annual rate of over 6 million bales in August. Rising incomes and changing tastes explain the improvement in mill use, but growth of the textile trade deficit explains why mill use has risen by only about 9 percent since the start of the year while domestic consumption has risen about 16 percent.

For the 1983/84 season, mill use is expected to total about 6 million bales, a little less than the seasonally adjusted rate for August. Declining retail apparel sales in July and August harbingers reduced cotton mill use in the future. Furthermore, while textile imports are expected to slow at seasonally adjusted rates during the last part of this year, imports will likely accelerate next year as a result of the renewed availability of quota in January.

Figure 2 shows seasonally adjusted retail sales at apparel and accessory stores in current and deflated dollars. In current dollars, retail sales increased about 9 percent between January and June, 1983, before declining in both July and August. The advance September figure showed an increase to nearly the June level. However, in real terms, retail sales improved only about 4 percent between January and June, and the real increase between January and September was probably even lower. The declines in July and August placed real retail sales lower than levels seen during some months in 1982. These data indicate that the 9 percent rise in mill use and the 16 percent rise in domestic consumption---mill use plus the textile trade deficit---have outstripped increases in real retail sales this year. This implies that apparel inventories at retail grew during the summer months when mill use and domestic consumption reached peak rates. Consequently, mill use could decline at seasonally adjusted rates in the future.

Another factor is the cotton textile trade deficit which grew from about 1.25 million bales in 1981/82 to about 1.7 million bales in 1982/83. Quotas are filling in important categories, and new quotas are being negotiated in an effort to control imports. Also, the dollar has weakened in recent weeks, and as foreign economies continue to catch-up with the U.S. economy,

a further weakening of the dollar could occur in 1984. These factors will help to limit imports through this December and stimulate exports. However, with the availability of new quota in January, imports will probably again rise as low wage countries exploit their basic cost advantage over domestic apparel producers. The past two years of strong imports has afforded U.S. retailers the opportunity to develop foreign sources, and these new contacts will also encourage imports in 1984. For 1983/84, the cotton textile trade deficit is expected to remain near 1.7 million bales. However, if the dollar fails to weaken significantly, the deficit could exceed 2 million bales.

The effect of the cotton textile trade deficit on mill use is summarized in figure 3. The Census Bureau uses data dating from 1967 to calculate the seasonal adjustment factors used in analyzing mill use each month. U.S. mill use follows, on average, a symmetrical pattern with stronger use expected in the first and third quarters of each season and weaker use expected the other 2 quarters. For 1983/84, a different pattern is expected because of the effects of textile imports. Mill use is expected to be stronger than normal in the first and second quarters of the season, as imports are restricted by the filling of quotas. However, beginning in the February-April quarter, seasonally adjusted mill use will probably be weaker than it has been in the past, because imports will probably accelerate after December. The weights calculated by the Census Bureau do not account for this phenomenon since imports have reached their current magnitudes in only the last 2 years.

The expected seasonal pattern described in figure 3 seems to be borne out by reports that mills are having difficulty selling for first and second quarter 1984. It also should be noted, that following the 1970 and 1975 recessions, the recoveries in U.S. mill use lasted 8 and 12 months, respectively. The current recovery in mill use is now 9 months old, further indicating that continued large increases are doubtful. Still, given continued economic growth both here and abroad, mill use could maintain its present strength and possibly even strengthen slightly in 1984/85.

This is not, however, a pessimistic outlook by historical standards. As shown in figure 4, both mill use and domestic consumption have trended steadily downward since 1966. The only years in which mill use increased during that period were the recovery years of 1971 and 1976. USDA's current outlook for increases in mill use in both 1983 and 1984 are predicated on continued economic recovery and changing consumer tastes. These would be the first time since 1966 in which mill use grew 2 years in a row.

## Exports

Leon Mears has presented the world cotton outlook and our expectations for U.S. exports through the rest of this season. As he pointed out, exports are currently running ahead of the normal seasonal pattern because earlier production problems in other exporting countries have temporarily reduced competing supplies. The large carryover stocks in the U.S. and the expected distribution of PIK entitlements have made U.S. cotton attractive. However, as harvests in the rest of the world proceed this fall and winter, competition among exporters will intensify, and U.S. exports will be limited



to about 5.3 million bales, only a little above a year ago. The combined forecasts for mill use and exports in 1983/84 put expected use of U.S. cotton at 11.3 million bales, 600,000 above 1982/83. However, a continued expansion in foreign production is expected to depress U.S. exports in 1984/85, causing total demand for U.S. cotton to decline in that season.

#### Supply-1983

The U.S. cotton supply for 1983/84 is now fairly well known. Carryin stocks were over 7.9 million bales, and the October Crop Report placed 1983 production at about 7.5 million. Combined, this will leave the U.S. with about 15.5 million bales of total supply. Of this, about 80,000 bales will be American Pima, the rest will be upland cotton. The following table presents estimates of the 1983/84 supply and disappearance by staple length, during 1978/79 to 1982/83. Estimates of beginning stocks by staple length are reliable because these are based on actual survey data. However, estimates of production by staple length are based only on averages from the past 5 years applied to the October Crop Report.

#### Estimated 1983/84 upland supply and previous year's disappearance, by staple length

	: 31/32 inch	: 1 inch to	: 1-1/16 inches	: 1-1/8 inches	:
Crop	: or less	: 1-1/32 inches	: to	: or	: Total
year	:	:	: 1-3/32 inches	: longer	:
	:	:	:	:	:

#### Million 480-lb bales

#### Total disappearance

1978	1.8	2.8	6.8	1.2	12.5
1979	2.4	3.7	6.6	3.1	15.7
1980	1.7	2.3	5.4	2.4	11.8
1981	1.7	2.2	5.8	2.1	11.8
1982 1/	1.5	1.4	4.2	3.4	10.6

#### Estimated supply

1983 2/ Beginning stocks	1.6	1.1	3.5	1.6	7.8
Production	1.1	1.3	3.5	1.6	7.5
Total supply	2.7	2.4	7.0	3.2	15.4

1/ Preliminary. 2/ Estimated.



The overall supply of cotton in 1983/84 will be greater than disappearance in 4 of the past 5 years. This will remain true even if weather since October 1 has reduced crop prospects by 200,000 to 300,000 bales. However, shortages of cotton 1-1/8 inches or longer might develop as the supply of those staple lengths is expected to be less than last season's disappearance. Exports will be most affected by this shortage. Of the 3.4 million bales of disappearance of the long staple upland category in 1982/83, over 3 million were exported. There may also be shortages of cotton 1 inch to 1-1/32 inches. Disappearance in 4 of the past 5 years was greater than the expected 1983 supply of those staple lengths.

#### Supply-1984

The 1984 U.S. cotton supply will probably be larger than it was this year. Beginning stocks for the 1984 season are currently estimated at 4.4 million bales, and 1984 production could vary between 10.5 and 13 million bales. This would leave 1984 supplies of between about 15 and 17.5 million bales, with the most probable level being about one-half million bales larger than in 1983.

Planted acreage in 1984 could vary between 11 and 12 million acres. Fairly strong participation is expected in the 1984 program as the 81-cent target price will probably look attractive next spring relative to market prices and cotton production costs. Even with a larger acreage reduction requirement, the 1984 program should look nearly as attractive as the 15-percent acreage reduction program in 1982. The maximum deficiency payment in 1982 was 13.92 cents a pound; for 1984, it will be 26 cents a pound. Over three-fourths of the cotton base was in compliance with the 1982 program.

The next table shows possible 1984 production outcomes with planted acreage varying between 11 and 12 million and yields varying between 490 pounds and 550 pounds per harvested acre. An average yield of 520 pounds was chosen, consistent with expected plantings less than the 15.4-million-acre base. With low acreage and low yields, production could equal about 10.5 million bales. The high acreage-high yield outcome would mean a 1984 harvest of nearly 13 million bales.

#### Yield per harvested acre

Acreage planted	:	Low	:	Average	:	High
	:	490	:	520	:	550
11		10.5		11.2		11.8
11.5		11.0		11.7		12.4
12		11.5		12.2		12.9

## Summary

A summary of the cotton outlook is presented below.

	1982/83	1983/84 estimated	1984/85 forecast
	Million 480-lb. Bales		
Planted Acres	11.3	8.3	11-12
Beginning Stocks	6.6	7.9	4.4
Production	<u>12.0</u>	<u>7.5</u>	<u>10.5-13.0</u>
Total Supply	18.6	15.5	14.9-17.4
Mill Use	5.5	6.0	5.5- 6.5
Exports	<u>5.2</u>	<u>5.3</u>	<u>4.0- 6.0</u>
Total Use	10.7	11.3	9.5-12.5
Ending Stocks	7.9	4.4	3.5- 7.0
Use/Supply	.58	.73	.60- .75

For 1983/84, a supply of 15.5 million bales and use of 11.3 million would leave ending stocks at 4.4 million bales, 3.5 million less than beginning stocks. The ratio of use-to-supply would be 0.73.

For 1984/85, supply could range between 14.9 and 17.3 million bales, and total use could vary between 9.5 and 12.5 million bales. Ending stocks will probably rise above the 1983/84 level, although they could fall between 3.5 and 7 million bales. The ratio of use to stocks will probably decline in 1984/85.

Figure 5 shows the relationship between the ratio of use-to-supply and average farm prices. There is a strong correlation between these two sets of data, with farm prices moving opposite to the use-to-supply ratio only in years when the loan rate interferes with normal market activity. The increase in the use-to-supply ratio in 1983/84 has been matched by a rise in average farm prices during August and September to about 65 cents per pound. The ratio will probably decline in 1984/85.

Just as mill use is not expected to follow the normal seasonal pattern this year, cotton prices might also depart from the normal pattern in 1983/84. Figure 6 shows the normal seasonal pattern for the 8 market average of spot prices. Normally, prices decline somewhat during harvest but then begin to rise from December through July. The spot price in July is usually about 7 percent above the season average, while spot prices in December average about 5 percent below the season average. Costs of storage explain this seasonal pattern.

However, this basic pattern has not always been followed during the last 12 years. 1973 and 1976 were years in which ending stocks were temporarily depressed and much larger supplies were expected in the years following. 1980 was a drought year in which supplies were expected to be tighter than

they actually turned out to be. In these three years, the seasonal pattern was reversed, and prices fell following the harvest season. Conditions during the 1983/84 season seem to be similar to those of the 3 atypical years.

It is also important to note that the March, May and July futures contracts are not offering premiums sufficient to cover the costs of storage from December. Also, the December, 1984 contract has been trading about 3 cents under the December, 1983 contract. The lower futures prices correlate well with the basic outlook I have tried to present in this speech, namely that while the supply of cotton is tighter this year than it has been in the past 2 years, U.S. cotton will probably become more abundant by next year. A combination of larger textile imports and increased cotton production overseas is pressuring demand while a partial relaxation of the acreage reduction program will allow U.S. production to rise.

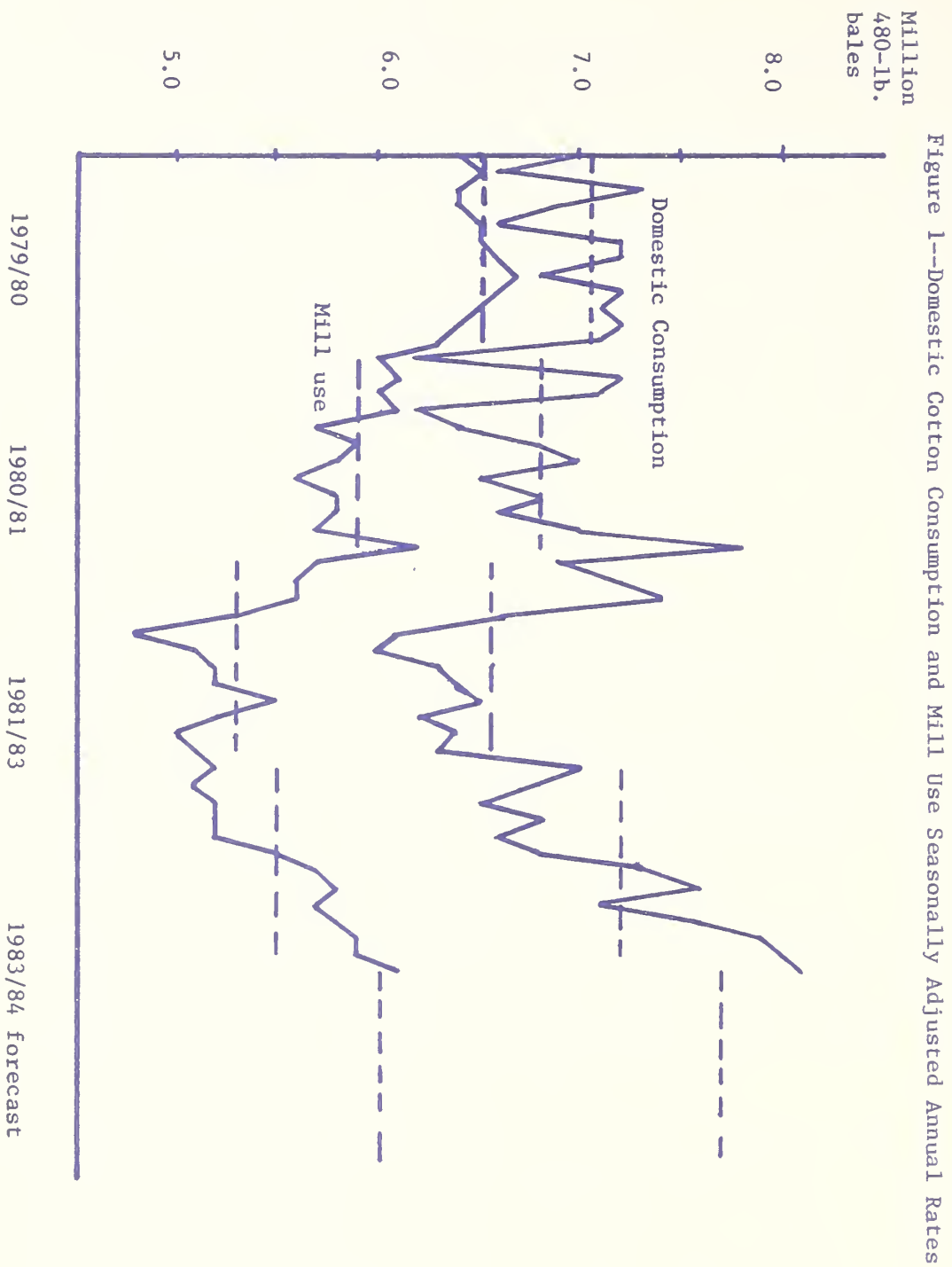




Figure 2--Seasonally Adjusted Retail Sales at Apparel and Accessory Stores

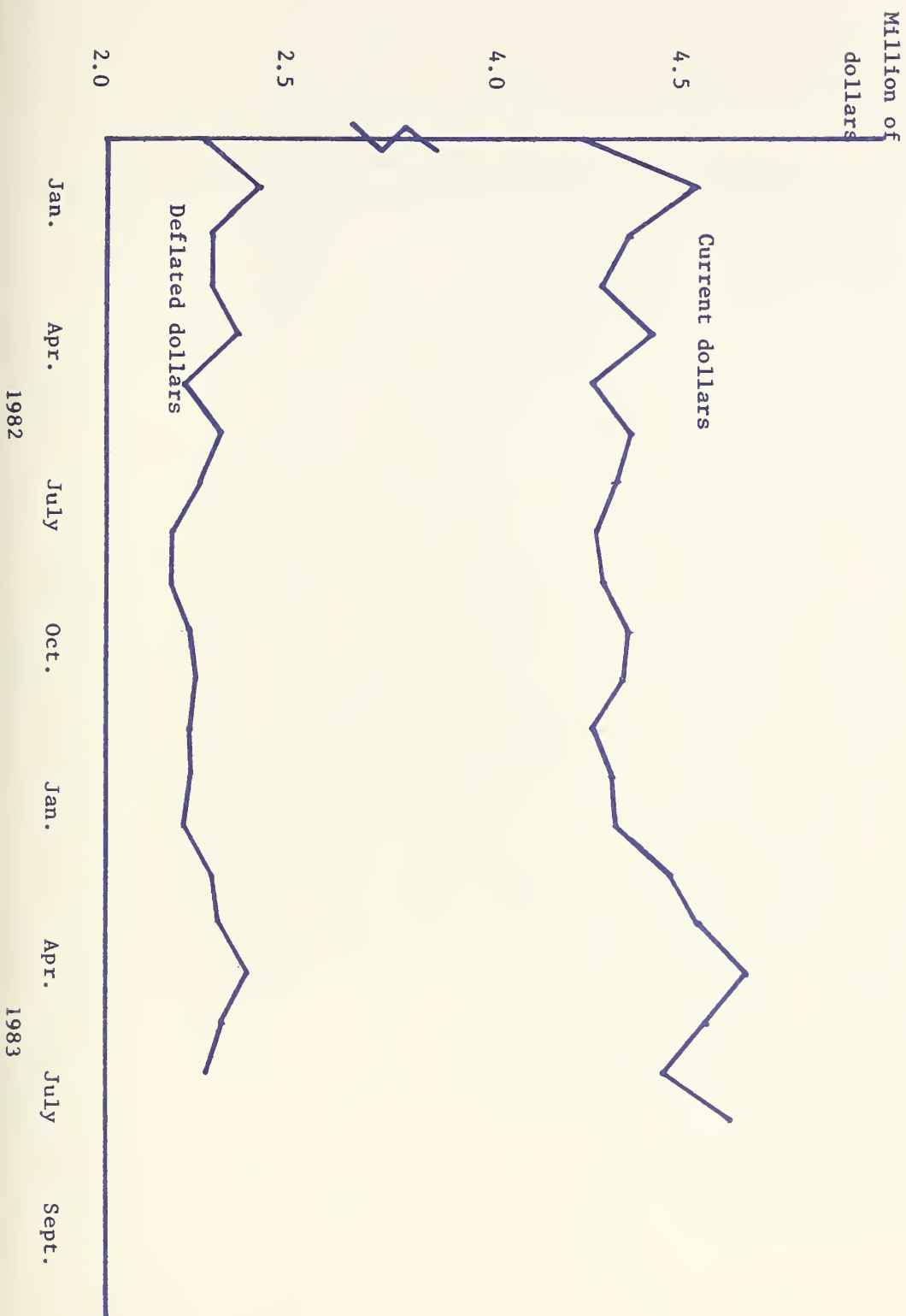
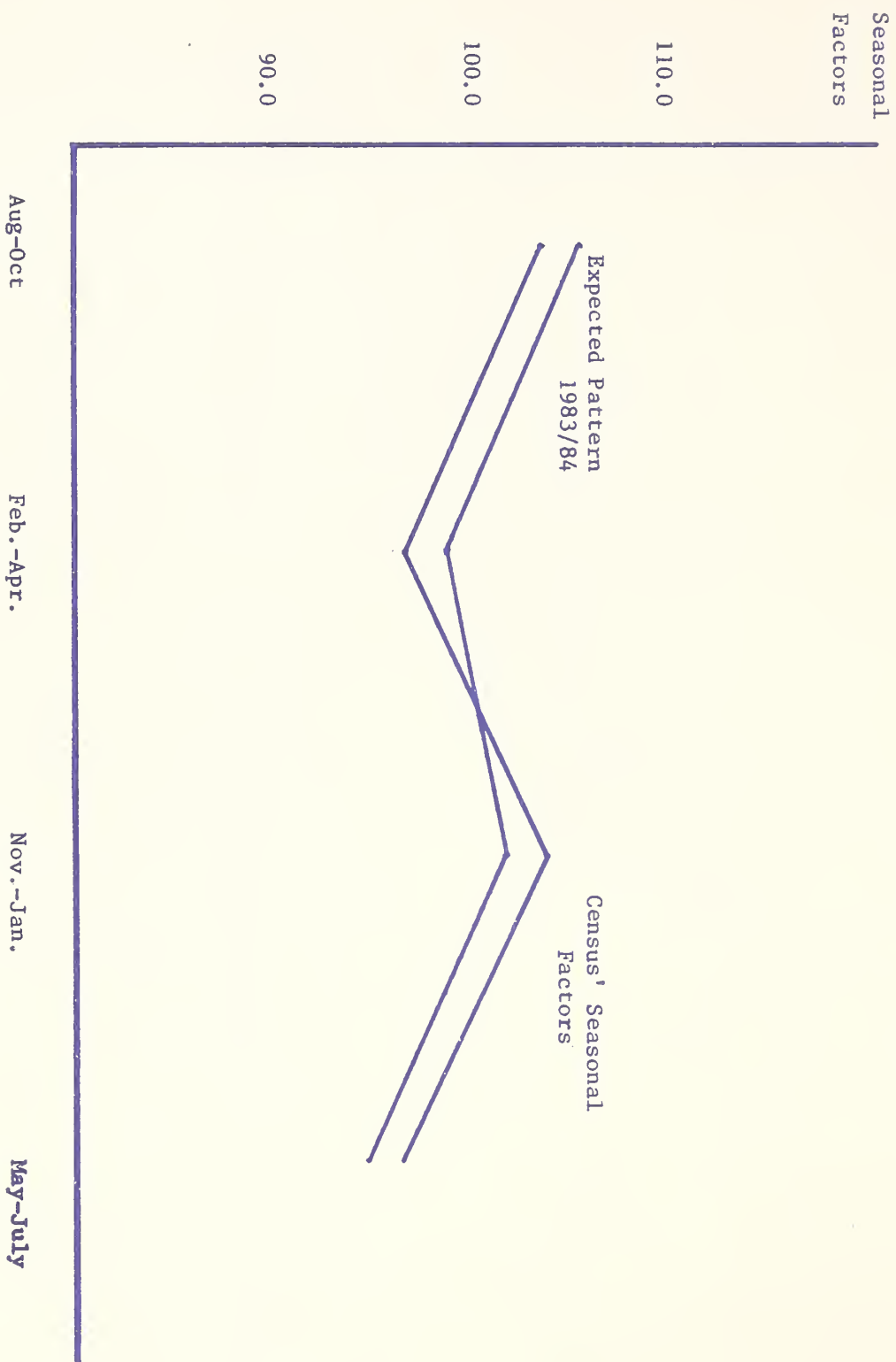
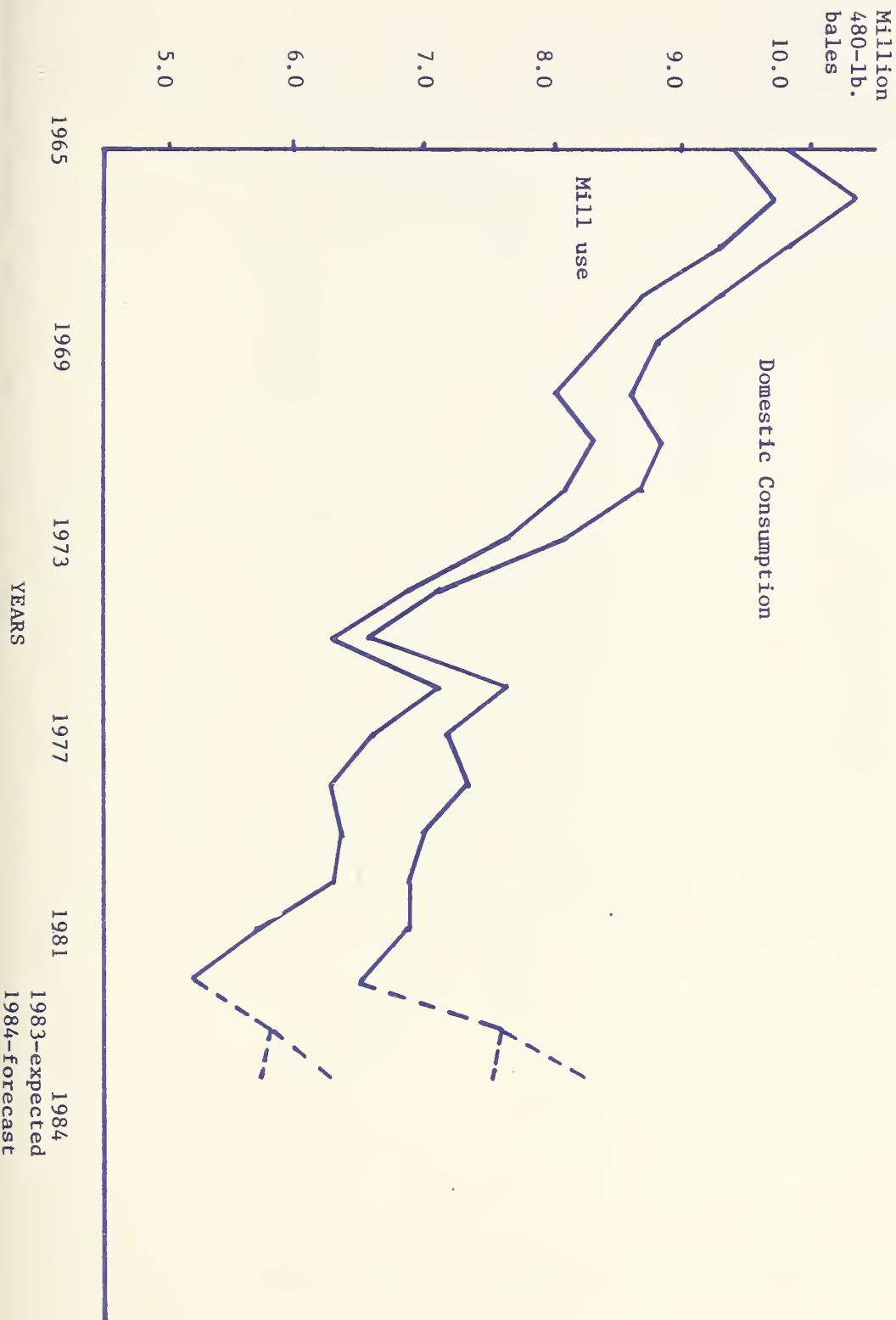


Figure 3--Comparison: Seasonal Weights for U.S. Mill Use and Expected Pattern in 1983/84



million  
480-lb. bales

Figure 4--Domestic Cotton Consumption and Mill use 1965 - 1984



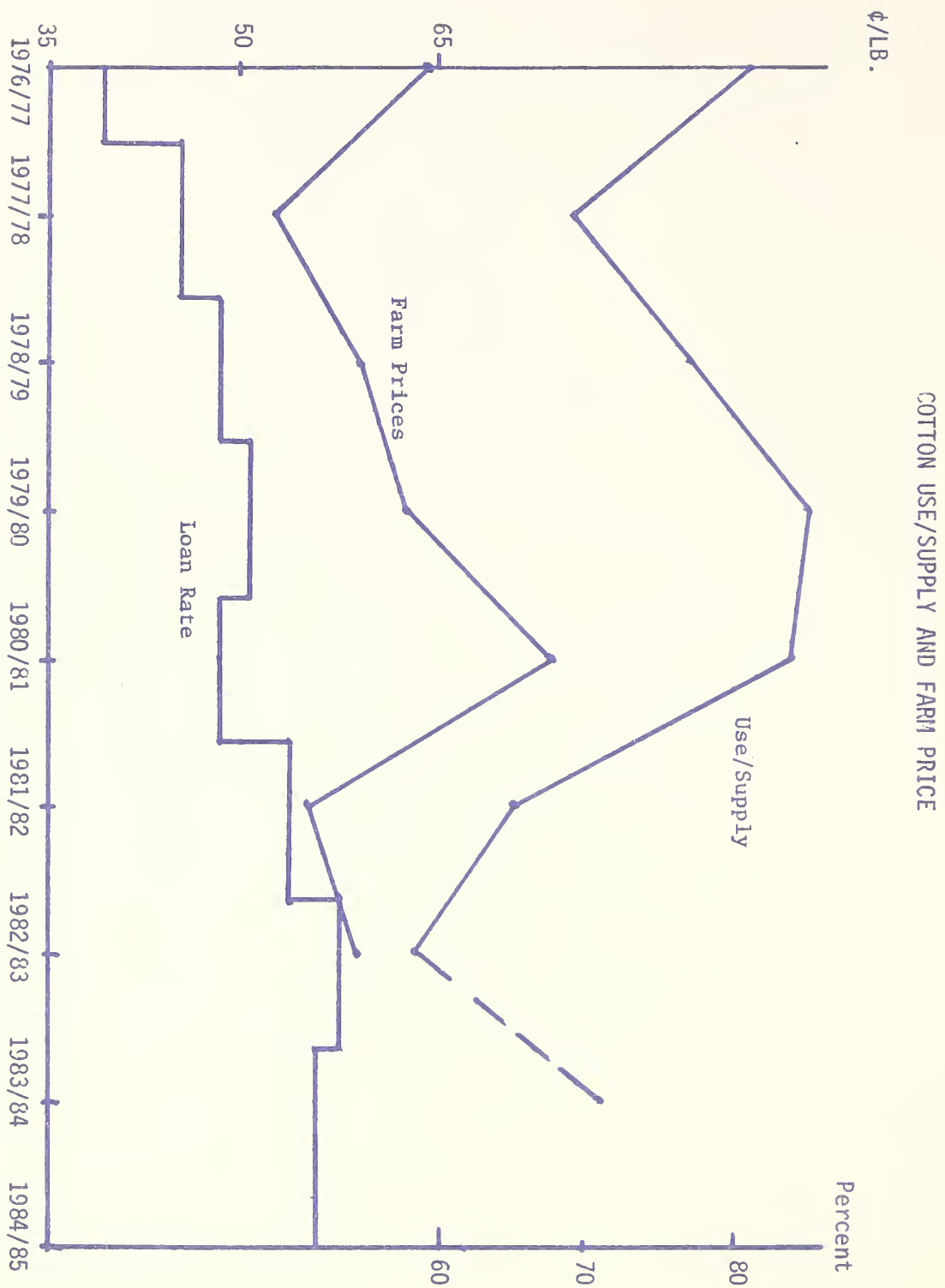
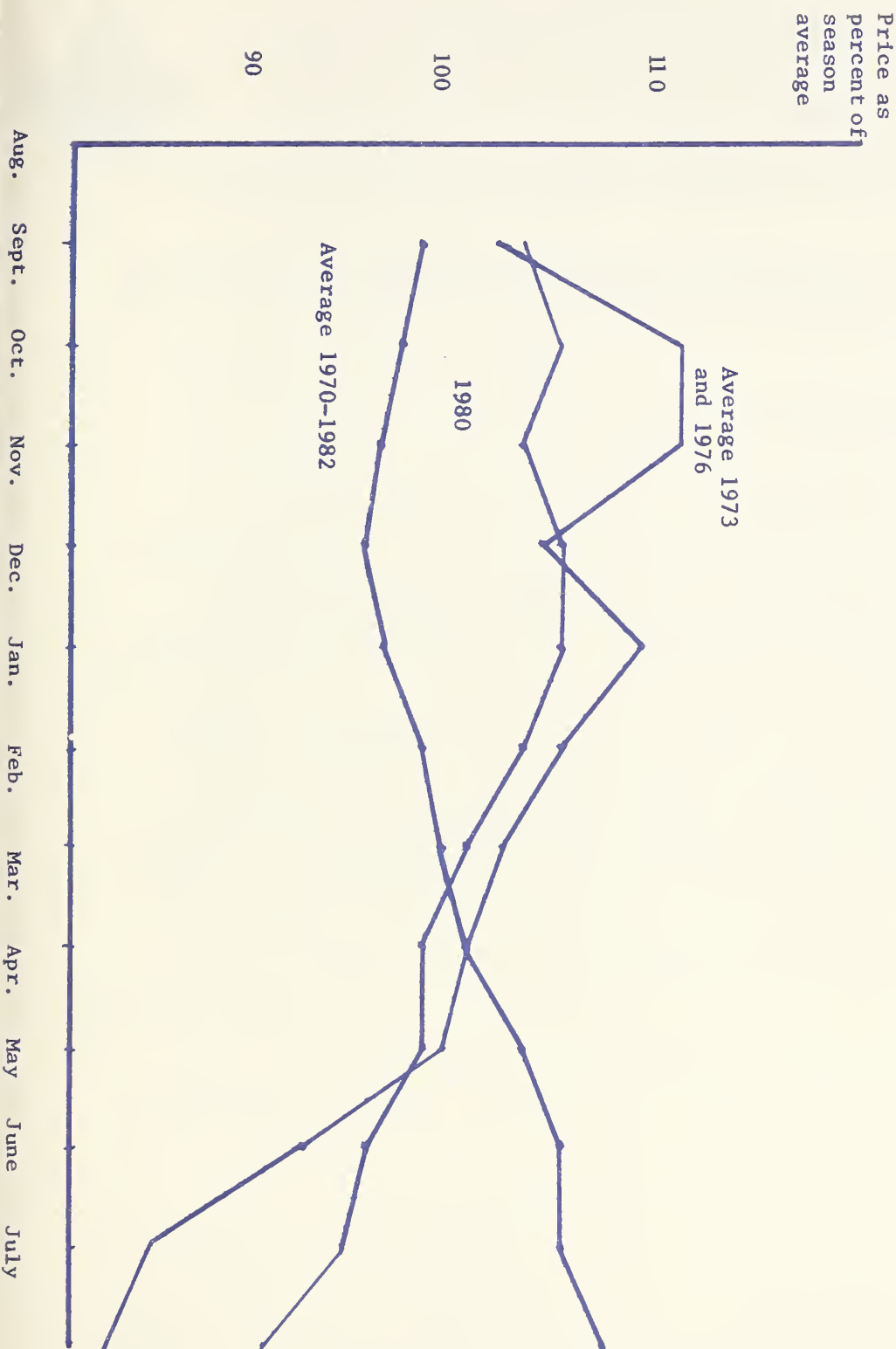


Figure 4--Domestic Cotton Consumption and Mill use 1965 - 1984



Figure 6--Seasonality in Spot Cotton Prices SLM 1-1/16



John S. Barr, III, Producer Steering Committee, National Cotton Council

OUTLOOK '84

1984 Agricultural Outlook Conference, Session 21  
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On behalf of the cotton industry, I want to express my appreciation for the opportunity you give us each year to review the important issues affecting our fiber.

The 1981 farm law expires with the 1985 crop. So now the question arises - what comes after PIK?

Program costs are going through the ceiling and pressures for adjustment are building.

Unless you have been marooned on an island in the Pacific for the last three or four months, you have probably gotten the impression that agriculture is not faring so well in the news media these days.

Your impression is absolutely correct. The American farmer is not only getting a bad press, he is taking a drubbing.

In the event that some of you are not fully aware of how farmers are being depicted, let me just give you a few worst-case examples.

Here is a quote from the Washington Post --

Question: Why is the farm program called P-I-K?

Answer: Because farmers cannot spell welfare. (Unquote.)

This quote is from Business Week:

A man goes into a shoe store and asks for a pair of loafers. He comes out carrying a farmer under each arm. (Unquote.)

And this story appeared in a newspaper in Nebraska -- Quote:

A farm dog, an inner city dog, and a suburban dog are all waiting outside a butcher shop for a piece of meat.

The suburban dog tries to bargain with the butcher for a lower price.....

The inner city dog plans to steal the meat.....

And the farm dog just sits on the curb and whines until the butcher gives him some meat. (Unquote.)

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All three of those stories fall into the same category.

Then there are the "view-with-alarm" stories.

Let me give you a few examples of those.

From U.S. News and World Report -- Quote:

Government subsidies to agriculture have multiplied five times in three years, reaching the point where farmers will get nearly as much money from Washington this year as they get from their crops. (Unquote.)

From Business Week -- Quote:

Farm supports are expected to soar to a record 23 billion dollars in the 1983 fiscal year -- a 76 percent increase. (Unquote.)

And on television, Jane Bryan Quinn on the CBS Morning News describes the current farm program as -- Quote: The most expensive in history. (Unquote.)

The Scripps-Howard newspaper chain in an editorial called "Farm Folly" charges that federal farm programs are out of control and breaking the budget. It even goes as far as to say that price support loans are a form of rural welfare.

And so on and so on.

This is not to say that all news media are giving the farmer a black eye. The Memphis Commercial Appeal, for instance, pointed out in an editorial back in April that farmers are going through their toughest times since the Depression and -- Quote -- "need relief at least until the farm economy picks up." (Unquote.)

But for the most part, you can hardly turn on TV or pick up a publication these days without hearing about the high cost of government farm programs.

Even Senator Robert Dole, who has served on Congressional agriculture committees for 22 years, says future farm legislation will be jeopardized unless program costs are brought under control.

What is the real truth about farm program costs?

And what about cotton program costs in particular?

One real truth about farm program costs is that nobody -- not even John Block or the most able economists in the Department of Agriculture -- knows for sure at this stage what those costs are actually going to be. "Guess-timates" are all over the block -- ranging anywhere from a little over 21 billion dollars to as high as 23 billion.

What do those cost estimates include?

The big three are price support loans, target price deficiency payments, and PIK program benefits.

But when you lump them all together -- indiscriminately and with absolutely no attempt at perspective -- the bottom-line cost figure you come up with may be impressively large, but as Ira Gershwin said -- "It ain't necessarily so."

Take price support loans, for instance.

Few, if any, news reports acknowledge that most of these loans are repaid with interest plus storage charges.

USDA, in estimating farm program costs at 21.8 billion dollars, says that more than 7 billion of it will probably be recovered in this manner. If the Department's estimate holds true, that means you could lop off at least a third of the so-called cost of farm programs.

There is no dispute about the fact that farm program costs have risen -- but a lot of people are overlooking an equally pertinent fact. And that is why they have risen.

The market-oriented farm program with its target-price concept was designed to provide financial assistance to farmers during periods of real need -- and certainly the last two seasons have been exactly that.

Last year at this time, the news media were in sympathy with the plight of the farmer.

Business Week commiserated by pointing out that the squeeze between heavy debt and rock-bottom commodity prices was having a catastrophic effect on farmers.

Even the New York Times carried a column about the deep financial trouble afflicting farmers. It included this statement -- and I quote:

"Both common decency and the public interest suggest a need for greater government intervention to stabilize producers' income."  
(Unquote.)

And a reporter for Newhouse News Service wrote that -- Quote -- "Owning a farm in the United States is becoming the practical equivalent of pouring money down the proverbial rat hole." (Unquote.)

And fair appraisal of farm costs has to take into consideration the drastic and unusual circumstances that characterized the past two seasons. They created drastic and unusual need on the part of the farmer.

And so before condemning the current farm program as a total mess that is completely out of control, its costs should be measured over a period of years -- not just for two out-of-the-ordinary seasons.

Cotton producers certainly do not have to be defensive about government outlays for their program. The record speaks for itself.

Look at target price deficiency payments which were authorized by the 1973 farm act.



They became available with the 1974 crop. But no deficiency payments at all were made to cotton producers for seven years -- almost a decade.

Then came 1981. Producers did not plant any additional acreage, and yet cotton yields hit record highs and the crop they harvested was the biggest in 28 years.

The timing could not have been worse. The big crop coincided with the deepest worldwide recession in 50 years, pushing cotton prices below the target and triggering deficiency payments for the very first time.

The total outlay came to some 467 million dollars.

1982 was a re-run of the previous year. The recession continued. But this time, producers cut their plantings by 21 percent. Storms ravaged 2 million acres of cotton in the Texas Plains. But even so, cotton's carryover increased still more. Price dropped still more, too -- not only going below the target but also below the loan. And for the second straight year, deficiency payments were triggered -- this time in the amount of 550 million dollars.

Cotton deficiency payments will be made again this year, but at lower than expected rates due to the price recovery that began to occur late in the season.

But what's important to remember is that supply and demand are being brought into better balance ... prices are recovering ... and deficiency payments are coming down.

What about government outlay for cotton price support loans? What does the record show about that?

During that same seven-year period when our producers were receiving no deficiency payments, the government's net cost of cotton price support loans came to a little over one-and-a-half million dollars -- that word million starts with an 'M' as in modest.

The books, of course, are not closed on loans for the '81 and '82 crops. Some are being repaid every week, and a large part of the 4 million or so bales still under loan will be used for PIK.

Disaster payments were another item in the total cost of the government cotton program. They were deleted, of course, by the 1981 act except for extraordinary situations like last year's storm in the Texas Plains.

But from 1974 through 1982, cotton growers received an average of about 140 million dollars a year in disaster payments.

The only other significant cost for the cotton program is land diversion. But cotton growers have been paid for diverting land only twice since 1974. One, of course, is the current PIK program and the other was in 1978 when payments totaled 44 million dollars.

So to sum up --

The total cost of the government cotton program for the nine crops from 1974 through 1982 was 2.3 billion dollars -- or around 258 million a year. And more than half of that was for disaster payments which are no longer authorized by law.

If you take out the disaster payments and add in this year's cotton PIK entitlements and deficiency payments -- which are expected to come to about 1.6 billion -- then you come up with a 10-year average cost of about 266 million. It seems to me that figure is not out of the ballpark as some reports indicate.

I am not convinced that it is at all unreasonable to spend an average of 266 million dollars on the cotton program in a year's time when 342 million dollars is being spent on the food stamp program in just a single week. In other words, food stamps are costing considerably more in a week's time than the cotton program is costing in a whole year. That is not to say that food stamp program costs are unjustified -- it is simply to put cotton program costs in perspective with other government outlays.

Granted, the over-all cost of the federal farm program has increased over the past two years. But what is being overlooked is the fact that the farm program is working just as it was intended to work -- providing help to the farmer when he needs it.

In terms of 1972 constant dollars, net farm income -- including government payments -- was 10.7 billion last year. That is only a little over half it was four years ago and less than a third of the 1973 income level in real terms.

Even with much larger government payments this year, net farm income is expected to rise very little -- if at all.

And so it is no wonder that farm program costs are up. This has been one of those times when that farmer out there who is providing food and fiber to feed and clothe 76 other people needs help to survive -- and God help those 76 people who depend on him if he does not survive.

Senator Jesse Helms, chairman of the Senate Agriculture Committee, is already calling for suggestions. Council President Jerry Brewer recently attended a summit conference organized by Secretary Block on future farm policy. Seminars and forums on farm policy are legion. Obviously, many people around the country are starting to think about farm legislation much earlier in advance than usual.

What are some of the key issues going to be?

One obviously will be target prices, the loan level, and other devices to protect producer income.

All of us know that cotton producers have been hurting -- not just marginal, weaker producers but solid people ... the kind who are the very backbone of our industry. And the primary reason they've been hurting is that the price of cotton has not been profitable for most of them in the last couple of years.

On the other hand, I hear merchants lamenting the fact that U.S. cotton has not been fully price-competitive with foreign growths in many situations in the last year or two.

This tension between the price growers need for cotton to return a profit and compete with other crops for land, and the price merchants need to compete with foreign cotton and other fibers is not new, of course.

We have faced it before in past years, and have not only worked at many different approaches to resolving the problem, but continue to work at them.

Our present system calls for a loan that provides orderly marketing and some protection on the downside, yet is low enough not to interfere with competitiveness. Target price payments are used to bridge the gap when market prices fall below production costs.

These tools have enabled many producers to stay in business, especially in recent years.

However, because of payment limitations, this approach doesn't offer much help for medium and large producers. While the PIK program, of course, has been without limits, it undoubtedly will be short-term. And with federal outlays for agriculture exploding in the face of federal budgets that are getting tighter and tighter, reliance on target prices, PIKs, and other mechanisms for the long-term is risky, to say the least.

There are other ways to get at the problem, of course.

The various credit programs are an example. Export PIKs and other subsidies are getting more and more attention in the face of the strong dollar and subsidies of some foreign producers. But most of these approaches tend to be short-term, band-aids, quick fixes, and risky from the standpoint of both political funding and potential trade wars.

Some individuals and organizations say the loan should be raised high enough to give the farmer a profit and eliminate payments altogether. They advocate tight production controls, and claim this would keep government costs low. But they forget that we tried to do this for a decade and a half in the 1950's and 60's, and it didn't work out that way.

Markets were lost because we were not price-competitive. Production was never restricted enough to prevent stock build-ups because decision-makers would not face up to declining markets they were causing. And instead of a low-cost program, we had a very expensive one. The total cost over the fourteen years from 1952 through 1965 was \$6.9 billion. Translated into today's dollars, it would be \$23.5 billion or \$1.7 billion a year for cotton alone. I'm sure you realize as well as I do that cotton program costs at this level are simply out of the question in the years just ahead.

Another approach being discussed is some form of income insurance that would be added on top of crop yield insurance. A government task force was mandated by the 1981 farm act to study the possibilities of this approach. The task force concluded that such a program could not replace the loan. It was agreed that acceptance of the current yield insurance program would be a key test, and that many other unanswered questions would have to be explored through a pilot program before it could possibly replace target prices.

We, of course, will continue to try to put action power to industry policies in every way that can bring about economic improvement for our industry.

In the long-term, however, I am convinced that any industry must be fundamentally competitive in cost of production, in quality of product and service, and in promotion. Bottom-line, it ultimately means that we in cotton have to be competitive in our research and in our promotion. These are the fundamental factors of real value and long-term effect which get to the heart of our basic problem of profitability and competitiveness.

U.S. cotton has the potential and the opportunity to participate in a growing market. World population is rising fastest in the areas where cotton's market share is greatest and where per capita use is very low. This signals strong possibilities for expanding our markets. Council economists see the possibility of an average world market increase of 1.25 million bales per year over the next five years.

In the long-run, U.S. cotton's ability to take advantage of that potential will depend on three things --

How well we do the job of improving productivity ...

How well we maintain a political climate that encourages productivity ...

And how well we succeed in keeping high quality, desirable products before the consumer.



Kenneth E. Howland, Foreign Agricultural Service

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## SUMMARY

The world tobacco economy is continuing its sluggish performance of last year. Looking back, cigarette output in 1982 showed no growth for the first year in decades. Cigarette exports declined after several years of expansion. Leaf tobacco trade contracted.

Leaf production, however, reached a record level and the large crop, coupled with weak demand, pushed 1982's ending stocks to an all-time high.

World cigarette output in 1983 may rise slightly, but will not return to the trend of previous years. Cigarette exports will be flat at best. Leaf trade will most likely fall below last year's level. And, although the 1983 crop is down, leaf stocks will be only marginally lower by the end of the year.

The outlook for 1984 is for more of the same: ample supplies entering the year, little growth in consumption and trade, and downward pressure on leaf prices.

## Leaf Production

The 1983 world tobacco crop was about 6 million tons, following 1982's record harvest of 6.8 million tons. Flue-cured and burley production fell sharply. The oriental crop was about unchanged. Production of other kinds dropped, reflecting the continuing shift in consumption away from cigars and dark tobacco cigarettes toward cigarettes made of light tobaccos.

The fall in flue-cured production was due primarily to acreage reductions in China and the United States and to adverse growing conditions in the United States and southern hemisphere producers. The estimated final outturn of just under 3 million tons is about the same as in 1981 and is judged sufficient to meet expected requirements for this kind.

The 1983 burley crop of 630 thousand tons is off by one-sixth, due almost entirely to the effects of drought in producing areas in the United States. Production expanded in most other countries, with Malawi harvesting a crop more than three-fourths larger than last year's. The supply situation for burley, while tighter than that for flue-cured and oriental, has been cushioned somewhat by carryover stocks from the 1982 U.S. crop.

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Turkey's larger oriental crop offset generally smaller harvests elsewhere and kept 1983 production in line with last year's total of just under 900 thousand tons. Supplies of this kind are ample, with both Turkey and Greece holding substantial stocks from previous crops.

#### Leaf Trade

Leaf tobacco exports are expected to total about 1.4 million tons this year, some 25 to 30 thousand tons short of 1982's volume and well below 1981's record level of nearly 1.5 million tons.

The United States will absorb a large part of the shortfall: exports from this country may be off by 20 to 25 thousand tons. Exports from India and Brazil may also be down because of their reduced supplies, while Canada, Zimbabwe, and Malawi, whose crops were larger in 1983, may export more leaf this year than last.

World imports may total slightly more this year than in 1982, with larger intake by the United States and Western European countries offsetting smaller imports by Asian countries experiencing balance of payments difficulties. But 1983 imports - like exports - will fall well short of 1981's record volume.

#### Cigarette Output

World cigarette output - a good indicator of tobacco consumption - was unchanged in 1982 when compared with 1981's total. Production in the United States, which accounts for nearly one-fifth of the number produced outside of China, was down by six percent due to a slump in domestic sales and an 11 percent loss in export volume. Output in the European Community was also down as higher taxes and anti-smoking publicity cut consumption in West Germany and the United Kingdom. Sales of generic brands and shag tobacco for hand-rolling cigarettes gained against sales of established brands as smokers in Europe became increasingly cost-conscious.

Among major consuming countries, only China continued to show significant growth in output.

Production in the United States is down again this year due largely to the effects of tax and price increases on domestic sales and of the over-valued dollar on exports.

Output in other major producers may gain marginally in 1983 over 1982.

#### Leaf Stocks

World stocks of leaf tobacco entering 1983 are estimated to have been nearly 7.3 million tons, the highest level ever. About nine-tenths of the 750 thousand tons build-up over 1982 occurred in China. However, the United States and other net exporters, e.g. India, Greece, South Korea and Thailand, accumulated stocks from their 1982 crops. Net importers generally drew down their inventories during 1982.

Stocks are expected to be reduced by the end of this year in most countries except China, but supplies entering 1984 will be more than adequate overall.

## Leaf Prices

Quality variations aside, imbalances between supply and demand depressed leaf prices in a number of countries in 1982 and again this year.

- In the United States nearly three-tenths of the marketings of flue-cured and burley in 1982 failed to exceed loan rates. Loan rates for the 1983 crops were frozen at the 1982 levels.
- Canadian flue-cured producers accepted a price guarantee for 1983 that is just 2-1/2 percent above the 1982 guarantee.
- Zimbabwe's flue-cured prices fell by one-tenth in 1982 and recovered this year only to 1981's level.
- Malawi's 1983 auction prices are running at two-thirds of last year's average.
- The Government of Turkey recently announced export prices for the 1982 crop that are unchanged from 1981's and at the same time discounted prices for older crop stocks.

Currency devaluations by Argentina, Brazil, Mexico, Zimbabwe and other exporters are working again this year to reduce the cost of their tobacco in terms of the dollar and other "hard" currencies.

## The United States

The United States, as the leading exporter and leading importer, continues to play a dominant role in world tobacco trade. The value of U.S. leaf exports reached a record of over \$1.5 billion last year and exports of tobacco products rose to \$1.3 billion, also a record, in spite of an eleven percent decline in the number of cigarettes shipped. The \$2.8 billion in tobacco exports compares with imports of \$569 million - a net contribution of nearly \$2.3 billion to the U.S. balance of trade in 1982.

Despite the growth in export value, leaf volume fell for the third consecutive year, as larger shipments of burley and fire-cured failed to offset a further loss in flue-cured exports. Generally, European markets took less leaf, while Asian markets (except, Japan and Korea) took more. However, U.S. imports for consumption (customs clearances) were also down, reflecting the six percent reduction in cigarette output last year.

Tobacco trade performance through the first eight months of 1983 is disappointing. Shipments of leaf and products are running substantially below last year's level. Cigarette exports are 18 percent below the volume shipped in the same period of 1982 and are not likely to recover in the remaining months of 1983. Leaf exports of 133 thousand tons are down ten percent. Export value is nine percent lower.

The fall in exports is for the most part due to smaller shipments to developing countries whose economies are distressed and whose foreign exchange balances are low. Exports to developed markets, in spite of the over-valued dollar and ample availability of cheaper competing tobaccos, have held up so far this year.

Considering the mixed quality and small size of the 1983 crop, generally weak export demand, and the high value of the dollar, leaf exports for the year could total less than 240,000 tons, the lowest level since 1971. Export earnings from leaf could fall by \$125 million.

Leaf imports (customs clearances) through August were 180,000 tons, nearly half again as much as in the same eight months of last year. All cigarette tobacco categories are up, with clearances of machine-threshed cigarette leaf - the item subject to recent tariff reclassification - having nearly tripled. This reflects a clearing of inventories prior to the August 28 effective date of reclassification.

General imports (arrivals) through August are down 15 percent from last year. Smaller arrivals of machine-threshed leaf account for most of the decline.

The trade outlook for 1984 is best described as uncertain. Economic recovery in many export markets is lagging. Further tobacco tax increases appear certain. The price disparity of U.S. leaf will not diminish: the freezing of U.S. support prices is being more than offset by the continuing strength of the dollar and devaluations of the currencies of competing suppliers that are desperate to export. Exports will remain depressed at around 1983's level - due in part to the tighter burley supply. Imports, likewise, could stabilize at about this year's volume if, as expected, domestic and export sales of cigarettes fail to rebound.

To repeat, tobacco has not escaped the impact of economic recession that continues to affect consumption and trade of all commodities. Reduced disposable incomes, unprecedented tax increases, continuing anti-smoking activity are working to depress consumption in the United States and most major markets.

Barring sustained recovery in world economic conditions and price and policy changes which significantly improve the competitive position of U.S. tobacco, there is little to indicate that domestic and export demand for U.S. leaf will materially improve in 1984.



UNMANUFACTURED TOBACCO: ESTIMATED PRODUCTION SELECTED COUNTRIES  
(THOUSAND METRIC TONS f.s.w.)

	Average <u>1978-80</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>1/</sup>
Canada	101	112	72	111
Mexico	74	70	75	68
USA	808	936	899	620
Argentina	64	51	69	73
Brazil	360	314	378	367
Turkey	246	168	214	220
Indonesia	116	110	117	122
India	462	481	525	500
Japan	155	138	139	138
Korea	113	87	115	95
Philippines	81	81	91	94
Thailand	80	75	86	92
China	1009	1500	2078	1495
Italy	124	131	143	140
Greece	125	127	132	131
Bulgaria	144	141	159	155
Yugoslavia	62	73	82	75
USSR	291	273	290	300
Malawi	57	51	59	83
South Africa	43	29	36	37
Zimbabwe	108	69	93	98
Other Countries	887	913	919	919
Total	<u>5510</u>	<u>5930</u>	<u>6771</u>	<u>5933</u>

1/ Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
October 1983

UNMANUFACTURED TOBACCO: ESTIMATED WORLD PRODUCTION BY TYPE  
(THOUSAND METRIC TONS f.s.w.)

	<u>Average</u> <u>1978-80</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>1/</sup>
Flue-Cured	2,582	2,974	3,531	2,987
Burley	575	649	755	631
Oriental	921	809	893	894
Other Types	<u>1,432</u>	<u>1,498</u>	<u>1,592</u>	<u>1,421</u>
Total	5,510	5,930	6,771	5,933

1/ Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
October 1983

FLUE-CURED TOBACCO: ESTIMATED PRODUCTION SELECTED COUNTRIES  
(THOUSAND METRIC TONS f.s.w.)

	Average 1978-80	1981	1982	1983 <sup>1/</sup>
Canada	99	111	69	108
USA	494	530	457	365
Argentina	34	32	41	44
• Brazil	215	205	248	232
Italy	21	25	26	26
Bulgaria	21	25	30	33
Malawi	24	19	22	24
South Africa	27	19	24	25
Zimbabwe	106	67	89	93
Pakistan	29	25	29	31
India	136	117	138	160
Thailand	49	42	46	51
Philippines	42	38	47	50
Rep. of Korea	77	64	80	63
Japan	89	86	84	79
China	858	1279	1800	1300
Others	261	291	300	303
Total	2582	2975	3531	2987

<sup>1/</sup> Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
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BURLEY TOBACCO: ESTIMATED PRODUCTION SELECTED COUNTRIES  
(THOUSAND METRIC TONS f.s.w.)

	Average 1978-80	1981	1982	1983 <sup>1/</sup>
USA	247	331	367	202
Mexico	26	23	25	24
Guatemala	6	4	5	8
Honduras	4	5	5	5
Argentina	8	6	13	15
Brazil	34	20	33	39
Italy	51	50	54	55
Greece	20	21	24	25
Malawi	15	19	27	48
Philippines	11	13	15	19
Rep. of Korea	35	23	35	32
Japan	21	17	20	20
Others	97	108	132	139
Total	575	640	755	631

<sup>1/</sup> Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
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ORIENTAL TOBACCO: ESTIMATED PRODUCTION SELECTED COUNTRIES  
(THOUSAND METRIC TONS f.s.w.)

	Average <u>1977-80</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>1/</sup>
Turkey	245	168	214	220
Greece	105	107	108	106
Italy	27	26	24	22
Bulgaria	120	112	125	118
Romania	26	20	27	27
Yugoslavia	42	48	52	46
Soviet Union	285	268	285	290
Other Countries	<u>71</u>	<u>60</u>	<u>58</u>	<u>65</u>
Total	921	809	893	894

1/ Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
October 1983



UNMANUFACTURED TOBACCO: ESTIMATED EXPORTS/RE-EXPORTS BY  
SELECTED COUNTRIES  
(THOUSAND METRIC TONS DECLARED WEIGHT)

	<u>Average 74-78</u>	<u>Average 79-80</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>1/</sup>
Canada	28	29	33	29	44
Mexico	21	28	18	15	14
USA	287	266	266	259	240
Argentina	22	20	17	26	24
Brazil	104	142	148	166	160
Greece	59	63	86	72	75
Italy	52	52	76	97	70
Bulgaria	68	66	65	60	58
Yugoslavia	23	25	22	25	26
Malawi	35	61	48	50	60
Zimbabwe	71	80	117	80	105
India	77	70	105	98	75
Indonesia	24	26	25	17	16
Rep. of Korea	45	34	38	31	27
Philippines	30	24	29	26	29
Thailand	24	36	37	38	46
Turkey	78	77	131	105	100
Others	286	262	225	234	233
World Total	<u>1334</u>	<u>1361</u>	<u>1480</u>	<u>1428</u>	<u>1402</u>

<sup>1/</sup> Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
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UNMANUFACTURED TOBACCO: ESTIMATED IMPORTS  
BY SELECTED COUNTRIES  
(THOUSAND METRIC TONS DECLARED WEIGHT)

	<u>Average 1974-78</u>	<u>Average 1979-80</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>1/</sup>
USA	159	191	179	198	185	200
Belg-Lux.	39	38	39	34	38	40
Denmark	15	16	15	15	16	15
France	78	77	34	38	29	38
W. Germany	183	186	189	171	146	163
Greece	1	2	3	4	5	4
Ireland	11	8	7	7	9	8
Italy	30	31	30	23	31	33
Netherlands	63	75	83	65	83	80
U.K.	165	151	118	140	127	124
EC Total	(585)	(584)	(519)	(497)	(484)	(505)
Austria	13	13	12	14	11	13
Finland	8	9	9	12	6	6
Norway	6	6	6	6	5	6
Portugal	9	10	10	8	8	8
Sweden	12	12	13	11	10	11
Switzerland	30	27	25	27	23	25
EFTA Total	(78)	(77)	(75)	(78)	(63)	(69)
Spain	63	75	77	71	66	69
Czecho.	18	23	26	20	18	18
E. Germany	18	23	26	25	25	25
Poland	8	18	23	24	11	10
Soviet Union	77	75	83	105	124	105
Egypt	25	33	35	42	43	45
China	--	25	50	80	30	20
Taiwan	12	17	15	11	16	14
Hong Kong	7	9	9	20	14	14
Indonesia	11	16	19	22	15	15
Japan	89	70	71	84	80	78
S. Korea	6	14	14	13	4	3
Malaysia	6	4	4	4	5	3
Philippines	9	13	13	15	13	12
Singapore	8	9	9	7	8	9
Thailand	9	10	11	8	13	6
Australia	12	11	12	11	12	11
Total Above	<u>1200</u>	<u>1297</u>	<u>1269</u>	<u>1335</u>	<u>1229</u>	<u>1231</u>
Others	134	114	139	143	136	147
Grand Total	<u>1334</u>	<u>1411</u>	<u>1408</u>	<u>1478</u>	<u>1365</u>	<u>1378</u>

<sup>1/</sup> Preliminary

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
October 1983

Cigarette Production Selected Countries  
(Billions of Pieces)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
USA	695.9	704.4	714.1	736.5	694.2
EC 1/	561.6	567.2	568.3	560.5	554.6
EFTA 2/	76.0	79.1	81.0	79.7	74.8
Spain	62.5	74.0	85.0	93.5	97.5
Japan	302.6	308.3	303.2	306.6	308.7
Taiwan	24.0	24.5	25.4	27.4	28.1
Rep of Korea	62.8	64.4	70.4	72.2	71.8
Philippines	50.9	55.3	58.8	52.5	52.5
Thailand	24.0	28.0	30.5	33.0	30.0
Australia	33.0	33.0	35.2	35.2	34.6
New Zealand	6.4	6.4	6.3	6.2	6.3
Egypt	27.5	29.9	32.5	35.0	37.0
Argentina	36.9	38.2	38.0	35.2	32.5
Brazil	137.0	137.0	142.7	135.0	133.2
Turkey	53.4	54.5	48.4	56.5	62.3
Mexico	49.0	51.2	53.5	52.5	52.5
Yugoslavia	53.7	60.2	59.1	64.2	61.0
Bulgaria	80.0	82.0	86.2	93.4	95.3
USSR	377.4	360.3	365.0	370.0	375.0
India	71.0	78.8	79.5	86.8	93.2
Canada	62.1	65.4	67.2	68.6	68.1
Poland	90.8	91.4	93.5	83.0	87.5
Indonesia	60.9	69.8	83.9	90.1	87.1
Pakistan	31.8	34.5	35.0	35.9	38.1
TOTAL ABOVE	3031.2	3097.8	3162.7	3209.5	3175.9
China	591.0	651.0	760.0	866.0	900.0
Others	451.1	462.7	475.9	491.2	502.5
Total	4073.3	4211.5	4398.6	4566.7	4578.4

Tobacco, Cotton and Seeds Division  
October 1983

1/ Belgium, Denmark, France, W. Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, United Kingdom

2/ Austria, Finland, Ireland, Norway, Portugal, Sweden, Switzerland

FLUE-CURED TOBACCO: ESTIMATED AVERAGE GROWER PRICES

(US DOLLARS PER KG.)<sup>1/</sup>

<u>Country</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u> <sup>2/</sup>
Canada	2.28	2.48	2.56	2.78	2.91	2.87 <sup>3/</sup>
USA	2.98	3.09	3.20	3.66	3.94	3.95
Argentina	1.68	2.49	3.56	4.25	3.07	2.00
Brazil	.93	.88	.73	.91	1.07	.52
Italy	2.77	3.00	3.27	2.90	2.92	3.76 <sup>4/</sup>
Malawi	2.03	1.93	1.24	2.00	2.38	1.73
Zimbabwe	1.53	1.11	1.27	2.58	2.17	1.91

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
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1/ Converted at Average Annual IMF exchange rates

2/ Preliminary

3/ CTMC - OFCTMB agreed average

4/ Norm Price before payment of buyers subsidy

SOURCE: Estimated on the basis of official statistics, reports of US  
Agricultural Counselors, and Foreign Service Officers and information  
from other sources.



UNMANUFACTURED TOBACCO: ESTIMATED AVERAGE EXPORT VALUES  
(US DOLLARS PER KG.)<sup>1/</sup>

<u>COUNTRY</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
<u>Flue-cured</u>					
USA	4.96	5.18	5.47	6.19	6.67
India	1.69	2.13	2.30	2.35	2.41
Brazil	1.67	2.40	2.55	2.70	3.50
Zimbabwe	2.25	1.84	1.93	2.42	3.33
S. Korea	2.38	3.17	2.97	2.88	4.32
Canada	3.17	2.77	3.56	3.85	4.06
Thailand	1.64	1.96	2.10	2.17	2.35
Malawi	2.85	2.75	2.34	3.47	3.75
Italy	1.85	2.40	2.21	1.72	1.75
<u>BURLEY</u>					
USA	4.55	5.16	5.67	6.40	6.92
Italy	1.69	1.73	1.88	1.54	1.56
Mexico	1.35	1.50	1.85	2.38	2.50
Greece	2.47	2.68	2.22	2.72	2.85
<u>ORIENTAL</u>					
Turkey	1.68	2.54	3.32	3.02	3.32
Greece	3.23	3.61	3.33	3.31	2.96
Italy	1.40	1.10	1.20	1.32	.57

<sup>1/</sup> Converted at Average Annual IMF Exchange Rates

SOURCE: Estimated on the basis of official statistics, reports of US Agricultural Attaches and Foreign Service Officers and information from other sources.

Tobacco, Cotton and Seeds Division  
Foreign Agricultural Service/USDA  
October 1983

Verner N. Grise, Economic Research Service, USDA

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Further changes were made in the Federal Government's tobacco price support and production control program in 1983 and other changes are pending in the Congress that affect the price support level and lease and transfer of quotas and allotments. The U.S. tobacco outlook for 1984 is highlighted by reduced, yet large supplies and by declining demand, both domestic and export. While production is down 30 percent from last year this year's supply is down only about 5 percent because of large carryin stocks. The size of the 1984 crop will depend in part on USDA's decisions on quotas, which, under current law, have to be made by December 1 for flue-cured and February 1 for burley and other kinds. Basic quotas for both flue-cured and burley are likely to be reduced. However, effective quotas may increase from 1983 levels especially for burley, because quota carryover will increase substantially. The rise in effective quotas and average yields point to a larger crop next year. Prices may change little from this year, but the hike in production may be large enough to increase the total value of the crop.

#### Cigarette Sales Declining

Cigarettes are the dominant product of the tobacco industry in the United States and most other countries. U.S. cigarette output may drop to 685 billion pieces this calendar year, about 9 billion below 1982 and 52 billion below 1981. Cigarette consumption will likely drop for the second year in a row. Consumption per person in the United States, 18 years and over, may drop by 153 cigarettes (about 8 packs of 20) from 3,746 to 3,593. This would be the lowest since 1954. During the 1970's, cigarette consumption shifted toward low-tar brands, however, the shift has slowed. There was a slight decline in the low-tar percentage last year, and the proportion may decline a little again this year.

Despite an increase in the smoking age population, total consumption of cigarettes may increase only slightly in 1984 and will likely remain below the 1982 level. Per capita consumption is expected to decline again. Tax increases are primarily responsible for the expected small growth in total consumption and the expected decline in per capita consumption. The Federal excise tax was increased from 8 to 16 cents a pack on January 1, 1983, the first increase since 1951. Twelve States also raised State excise taxes in 1983 an average of about 4-1/2 cents a pack and one State added a 1-cent a pack surcharge per pack. Five States also removed sunset provisions of

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previous excise tax increases. State tax levies now vary from 2 cents per pack in North Carolina to 26 cents in both Connecticut and Massachusetts. The combined city and State tax is 29 cents a pack in New York City and 27 cents in Chicago, Illinois. Further State tax increases are expected to occur in 1984.

Antismoking publicity and legislation continue to affect the industry. Many states, cities, and counties have laws that either prohibit smoking in certain places or segregate smokers from non-smokers. The U.S. Department of Health and Human Services and voluntary health agencies are continuing efforts to discourage smoking. The cumulative effect of publicity and ordinances on smoking is uncertain, although it likely accounts for some of the downtrend in per capita consumption.

Wholesale cigarette prices rose 5 times the past 14 months, largely because of the doubling of the Federal excise tax. Retail cigarette prices jumped 26 percent from August 1982 to August 1983. Retail prices may go up by 12 percent in calendar 1983, compared with about a 3-percent increase in the overall consumer price index. Retail price hikes are likely to slow in 1984, and with an improved economy, this could slow the drop in per capita use and result in a small increase in total cigarette consumption.

#### Changes in Tobacco Per Cigarette Affect Total Use

Tobacco use in cigarettes remained relatively constant during the 1970's and in 1980 and 1981, despite the gain in cigarette output. For many years, manufacturers could economize in leaf use as they shifted to filtertip brands and used the whole leaf. Later, manufacturers began utilizing various leaf expansion processes and in recent years have used more imported tobacco to stabilize costs.

U.S. cigarette manufacturers used an estimated 1,201 million pounds of tobacco (unstemmed processing weight) in cigarettes in 1982. This was about 4 percent below 1981 because cigarette output declined. Use of both U.S. tobacco and imports declined. This calendar year, with cigarette output decreasing, perhaps 2 percent, manufacturers are likely reducing their total tobacco use.

Manufacturers used an estimated 1.73 pounds of tobacco (unstemmed processing weight) per 1,000 cigarettes produced in 1982, about 2 percent above a year earlier. Domestic flue-cured accounts for about 35 percent of the tobacco used in cigarettes, burley 33 percent, foreign grown 30 percent, and Maryland 2 percent. For many years the flue-cured share has declined as the imported tobacco share has risen. It appears that imports account for around 15 percent of the flue-cured use.

#### Consumption of Other Tobacco Products

Cigar and smoking tobacco consumption are trending downward. Consumption of large cigars in 1983 will total about 3.4 billion, 6 percent below 1982 and less than one-half the 1964 peak. Small cigar consumption may fall to 1.29 billion. Use of smoking tobacco in 1983 is down to 33 million pounds, a record low. Consumption of cigars and smoking tobacco may drop further next year.

Snuff production is up a little. Moist snuff production is up while dry output is down. Chewing tobacco production is down a little. The drop in plug production more than offsets the increase in loose-leaf production.

#### Tobacco Crop Much Smaller

Tobacco production is down 30 percent this year because of weather-related yield reductions and smaller effective quotas and acreage allotments. Because of weaker demand and lower quality tobacco, flue-cured prices changed little this year compared with a 12-cents-a pound hike last year. Flue-cured cash receipts from the 1983 crop are substantially lower. Net farm returns have been further squeezed by the cost of producing and selling flue-cured tobacco which rose about 5 percent per acre from 1982. Total costs per pound rose sharply because of the drop in yields.

As of October 1, the tobacco crop was forecast at 1.38 billion pounds. Despite the sharply smaller 1983 crop, the increased carryin means that total supplies for the 1983/84 marketing year are down less than 5 percent.

Price support levels for both burley and flue-cured tobacco and all other eligible kinds are the same as last year, under the legislation signed July 25. When burley auctions open later this month, prices may do well to reach last season's alltime high due to reduced quality of the crop. Cash receipts from the 1983 burley crop will drop sharply.

At the beginning of the 1983/84 marketing year, unsold tobacco held under Government loan totaled about 790 million pounds (farm-sales weight), about double that of a year earlier. The big jump resulted from 260 million pounds of flue-cured and 269 million pounds of burley being taken under loan from the 1982 crops. Loan takings from this season's flue-cured crop may exceed 130 million pounds. The takings this year, plus 1982 crop carryover, combined with holdings of older crops under loan, create a sizeable oversupply. Prices of much of the flue-cured tobacco loan takings exceed the cost of comparable tobaccos from other countries.

The 1983 flue-cured auction season is nearing completion with auction prices averaging \$1.79 a pound, about the same as a year ago. Some grade prices were higher, some lower.

Government price support is mandatory for tobacco produced under marketing quotas. Levels of support prices for 1984 are uncertain because of pending legislation that would freeze them at the 1982 and 1983 levels. The Senate has passed a bill to freeze 1984 flue-cured supports and keep price support differentials for other types in line with flue-cured and the House is expected to vote on a similar measure soon.

For eligible 1984 crops, the overall price support under basic legislation is likely to rise about 5 percent from 1983. This estimate is based on indicated changes in the parity index. But, under current legislation, the support increase can be held to 65 percent of the amount permitted under the basic price-support legislation. In 1984, price supports for various types of tobacco may increase a minimum of about 3 percent from the frozen 1983 level, depending on the supply and demand for the tobacco.



Even though this year's flue-cured crop is smaller than last year's, the large carryover is bringing only a 3-percent decline in the 1983/84 supply from last year. The flue-cured effective quota was reduced by 3 percent this year. With considerably lower yields and a smaller acreage, growers may sell 15-percent less in 1983 than in 1982. Because of excess production in 1982, 37 million pounds of 1982-crop tobacco was sold in 1983. A few growers may have tobacco in excess of their allowable 110 percent this year. Leasing is not authorized during the marketing season, so such tobacco will have to be carried over on farms, because Stabilization or other firms have no provisions for receiving or processing this tobacco.

Under the acreage-poundage program, USDA is required to announce the national marketing quota for the 1984 crop of flue-cured tobacco by December 1, 1983. However, there is legislation pending that would change the announcement date to December 15. The 1983 quota was 910.5 million pounds, or about equal to prospective use. Still, current supplies equal about 3.3 year's use, compared with the desired supply of 2.4 years, as provided for in the legislative formula. Because this season's marketings will fall below 1983's effective quota, the effective quota for 1984 will be higher than the basic quota.

The 1983/84 supply of burley tobacco is about 5 percent below last season. Carryover stocks on October 1 were 17 percent above a year ago. This year's crop is 44 percent below last year's record large crop. Acreage was down 15 percent but yields are off 34 percent. USDA regulations allow the crop to be sold in bales, sheets, or hand-tied. Most of the crop will likely be sold in bales or sheets. Due to reduced demand, both domestic use and exports will probably be lower than in 1982/83. Carryover stocks next October will likely decline about 100 million pounds.

Legislation relating to burley tobacco requires that the national quota be at least 90 percent of the estimated disappearance for that year and at least 90 percent of the previous year's quota. With disappearance in the 590-to-605 million-pound range the last two years, the 1984 marketing quota may be reduced from this year's 647 million pounds. The 1984 effective quota will increase because of this year's underproduction.

Among other types of tobacco, supplies of fire-cured, dark air-cured, Southern Maryland, and cigar tobaccos are all down. However, adequate supplies of these types are available and dark air-cured supplies are excessive. Producer referendums will be held early in 1984 to determine if growers of cigar binder (types 51-52) and cigar filler and binder (types 42-44, 53-55) desire acreage allotments for their next three crops. About one-fifth of the Maryland (type 32) tobacco, a non-quota kind, was produced in Pennsylvania this season outside the traditional Maryland belt.

#### 1983 Tobacco Legislation and Prospective Tobacco Program Changes

Legislation signed on July 25, 1983 froze 1983 tobacco price supports at their 1982 levels (Public Law 98-59). The legislation also included two provisions dealing specifically with burley tobacco. One provision allows the Secretary of Agriculture to reduce burley quotas by as much as 10 percent in any one year, if necessary, to control overproduction

(previously, the maximum reduction permitted was 5 percent). The second provision directs the Secretary of Agriculture to determine whether imports are interfering with the U.S. price-support and production-control program if (1) the support level is frozen or increased by less than 65 percent of the amount estimated under the current formula or (2) if stocks of burley tobacco under loan exceeded 20 percent of the marketing quota. Both exist and an Interagency Committee is being formed to ascertain whether or not there has been damage. If the study indicates interference, corrective action would be recommended to the President.

On October 7, the Senate passed a bill (S.1529/H.R.3385) that would make more extensive changes in the tobacco price-support and production-control program than does the legislation enacted in late July. The House Agriculture Committee has approved a similar bill (H.R. 1440), but the full House had not considered the bill as of October 21.

This legislation includes the following provisions:

- o Flue-cured price supports in 1984 would be frozen at the 1982 level. Price supports would be frozen again in 1985, if the 3-year moving average index of prices paid by farmers (including wage rates, interest, and taxes) increases less than 5 percent. Then, beginning in either 1985 or 1986, the increase in price support would move up or down from year to year based on the current formula, and the Secretary of Agriculture would retain authority to approve as little as 65 percent of any increase called for by the formula in any given year.
- o Beginning in 1984, the support price for burley and other types would be set so as not to narrow the normal price support differential between flue-cured and other types of tobacco.
- o The Secretary of Agriculture would have the authority to reduce price supports on less marketable grades of flue-cured tobacco. Price support grade reductions could occur for not more than 25 percent of the total flue-cured crop. The reduction could not exceed 12 percent of the rate that would otherwise be established. The reductions would not be included in determining the weighted-average support rates for eligible grades of flue-cured tobacco.
- o Lease and transfer of flue-cured quota would be abolished beginning in 1987. For the 1984 through 1986 crops, payment for leasing must be made after the tobacco is marketed. Beginning in 1987, flue-cured quota owners could (1) grow the quota on land to which the quota is assigned (2) rent the quota to an active grower, who would produce the crop on the land to which the quota was assigned. However, rental payments cannot be required until after the crop is sold or (3) sell the quota to an active grower in the county. The seller would be required to allow the buyer up to five years to pay for the quota.
- o Beginning in 1984, no more than 15,000 pounds of burley quota could be transferred to a single farm, instead of the current 30,000.

- o Imported tobacco would be required to undergo essentially the same type of grade and quality inspection as American tobacco. Pesticide content would have to be certified essentially the same way as for American tobacco.
- o Other provisions include giving the flue-cured Stabilization Cooperative greater flexibility in using no-net-cost funds to reduce loan stocks. The amount of quota authorized for new flue-cured growers would increase, and the requirement that quota holders who rent or lease out quotas pay the same amount as growers into the no-net-cost fund would be eliminated. For burley tobacco, leasing of quota would be prohibited after July 1 of the crop year for which the lease applies. For burley, when two or more tracts of land are located in contiguous counties, the quotas could be combined and operated as a single farming unit. The bills would extend the deadline from December 1, 1983, to December 1, 1984, for nonfarming entities to sell their tobacco quota. The latest permitted announcement date for flue-cured quota levels would be changed to December 15, instead of December 1. For burley and other types of quota tobacco, the announcement date for quota levels would be extended to March 1 from the current February 1.

Bert W. Hawkins, Animal and Plant Health Inspection Service

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The agency I head, the Animal and Plant Health Inspection Service (APHIS), is responsible for protecting our nation's livestock and crops from pests and diseases, whether of domestic or foreign origin.

APHIS has two program organizations: Plant Protection and Quarantine, or PPQ...and Veterinary Services, or VS.

Deputy Administrator Harvey Ford heads PPQ and John Atwell, VS. Both gentlemen are here today and will be talking to you about their particular programs. I will just try to give you a brief overall view.

#### FIRST LINE OF DEFENSE

APHIS inspectors, assisted by U.S. Customs, stand guard at our major ports of entry--sea ports, border stations, and air terminals--keeping out foreign diseases and pests that could harm our agricultural economy. They are our first line of defense.

They inspect not only incoming animal and plant shipments, but also other cargo--anything that could carry animal or plant disease organisms or pests. This includes foreign food products and the personal luggage of incoming travelers.

If a disease or pest slips past our border or port defenses, and a disease or pest outbreak occurs, APHIS emergency eradication and control teams go into action. These teams are located in various parts of the country. They are directed by an APHIS emergency headquarters staff in Hyattsville, Maryland, just outside Washington, D.C.

These emergency teams also cope with outbreaks of domestic pests and diseases.

Of course, wiping out a pest or disease is sometimes impractical from the agricultural producers' point of view. They may decide the pest or disease is economically tolerable. We usually take our cue from the agricultural community. However, as a rule, we urge eradication rather than control, because over the long run eradication is cheaper...and the risk of a major outbreak is greater during control.

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## APHIS PHILOSOPHY: SEE

So our approach is simple: Keep it out or wipe it out!

But to elaborate a bit, I "see" the approach summed up in the acronym "SEE"--that is:

- o "S" for "Surveillance"
- o "E" for "Enforcement"
- o "E" for "Exotics"

This acronym represents the three responsibilities, or functions, the federal government must assume, or a significant share of them, because the states cannot always handle these areas alone.

### SURVEILLANCE

The first function of any federal agency is to take those tasks the states cannot accomplish--and surveillance is often one of them.

For example, each state can survey its own territory for a particular disease or pest. But each state cannot know what is next door, and therefore, what to look out for. The federal government can, because of the wide geographical sweep of its programs.

### ENFORCEMENT

The states should have as much enforcement authority as possible. With that authority comes responsibility to enforce the laws thoroughly and equitably.

At state borders the state enforcement level stops, and the federal government steps in to do what the states cannot do. When an animal or plant is brought across the state line, determining whether it is infested or disease-carrying becomes a federal responsibility.

In some areas, federal and state authorities share enforcement, with the states assuming primary responsibility.

Take the problem of uncooked garbage. It can contain a variety of animal diseases, such as trichinosis, African swine fever, hog cholera, and foot-and-mouth. If swine are fed uncooked garbage they can become infected.

So the Swine Protection Act requires that garbage be cooked before it is fed to swine, to kill any disease that might be present in it. It sets "minimum standards" for the cooking of garbage--that it must be cooked at a certain temperature, by someone who is licensed, and so on.

By setting "minimum standards," the Act in effect says that the states, if they wish, can set tougher ones--and many have. In fact, 16 states forbid the feeding of any garbage to swine, uncooked or cooked. All told, 36 states have passed garbage cooking laws that either meet or exceed federal minimum standards.

So this is an example of states assuming a primary responsibility for enforcement. There are other instances of the federal government assuming sole responsibility.

Like animal welfare. The Animal Welfare Act specifically gives enforcement responsibility to APHIS.

#### EXOTICS

"Exotics" refers to the foreign diseases and pests--and by extension to our international activities.

APHIS's international arm has grown substantially in the past several years. It makes sense to spend dollars on diseases established overseas, rather than allow them to invade the United States and try to combat them on our own soil.

Fortunately, the United States has none of the world's most-feared livestock and plant diseases, and we want to keep it that way.

As the result of a lot of hard work, we are further advanced in plant and animal health than most other countries. We don't want all that hard work to have been in vain. So we must do everything we can to protect and defend our agricultural economy from exotic insects and diseases.

Foreign pests and diseases are frequently more destructive and costly than domestic organisms, for a number of reasons:

- o U.S. crops and livestock have not built up natural immunities.
- o Vaccines and biologicals may not be in production or stockpiled here.
- o We may not have developed resistant plant varieties. And we may not have natural enemies to counter invading plant pests.

The most effective way to prevent invasions by foreign pest and diseases is to attack them while they are still far from our borders. APHIS has an outstanding track record of cooperation in international eradication efforts...from locust control in Africa to screwworm in Mexico. Generally, APHIS' policy is that the closer threats move to U.S. borders, the greater the danger to U.S. agriculture.

## INCREASING INTERNATIONAL ACTIVITY

Let me expand a bit on our increasing international activity.

Much of our inspection takes place overseas, in the country where animal and plant shipments originate. For example, for years now, we have pre-cleared tulip bulbs in Holland, before they are shipped to the United States. We are now doing more preclearance in foreign countries.

In fact, we are now giving increasing emphasis to all overseas activities-- not only to overseas inspections, but also to participation in cooperative international disease and pest control and eradication programs, and to helping other nations eradicate animal and plant diseases and pests. By helping others, we help ourselves.

## EXPORT BENEFITS

Greater international involvement helps our export effort. As we do more overseas, our customers perceive a greater willingness on our part to protect ourselves from pests and diseases. This perception then strengthens the confidence of foreign importers in our products...and encourages them to import more of them.

So we maintain and build on our reputation of exporting only healthy and pest-free farm products. It's this reputation that sells our farm products abroad--our wheat, soybeans, citrus, meat, animals, or whatever.

It's important to do all we can to encourage our farm exports, because they continue to run a surplus, in contrast to our overall non-farm trade exports. Our annual non-farm trade deficits would be a lot larger if it weren't for our farm export surpluses.

In FY 1982 we exported \$23.7 billion more in farm products than we imported. This cut our non-farm trade deficit--which was \$57 billion-- by about half.

Two other benefits that flow from our greater international involvement:

First, we extend our line of defense overseas, which eases the burden of increasing international traffic on our border defenses.

Second, we build up our expertise on diseases and pests we never had--or had so long ago that we have forgotten how to deal with them firsthand.

## OUTLOOK

So what's the outlook?

Looking around here at home we see that we are the best-fed nation in the world. We spend proportionately less of our household budgets on food than people of most other nations do. Less than three percent of our population--the farmers of America--feed us, and then help feed the rest of the world.

We are fortunate to be blessed with our "agricultural miracle." But that miracle would not be possible without an effective defense against animal and plant disease and pests, not only at home but overseas as well.

We must maintain that defense--using all the environmentally safe means at our disposal.

Looking ahead, I see APHIS continuing to do the job of protecting America's agriculture--as long as it has the people and tools to do it with.



William F. Helms, Animal and Plant Health Inspection Service

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My organization in APHIS is Plant Protection and Quarantine--or PPQ.

How does it help protect American agriculture?

Let me count the ways!

One: We exclude agricultural pests and diseases by inspecting imports, either in the country of origin or at U.S. ports of entry--and inspecting the baggage of incoming international travelers as well.

Two: We work with state officials, industry, and other cooperators to find plant pest infestations early--before they can do serious economic damage.

Three: When feasible, we eradicate such infestations.

Four: Or we manage--contain--them when the most practical choice is to live with the pest.

Five: We establish rules for interstate and international commerce to minimize the risk of pest introduction or spread.

Let me elaborate.

#### EXCLUSION

The job of excluding pests and diseases at ports of entry falls to some 900 APHIS-PPQ inspectors, who work closely with U.S. Customs. Seven days a week they man what is our first line of defense--at air terminals, sea ports, and border stations. They check passenger baggage and cargo, truck and rail freight, and even packages from foreign countries.

Some statistics:

In fiscal year 1982, PPQ inspectors cleared more than 298 million travelers and their baggage. They inspected more than 245,000 airplanes and 461,000 cargo shipments. They intercepted one million prohibited agricultural products, including more than 100,000 prohibited meat and animal byproducts. They intercepted more than 22,000 pounds of meat and animal products from the international mails alone.

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Seeing to it that foreign garbage is properly disposed of is another responsibility of our PPQ inspectors. Foreign garbage includes leftover airplane meals and garbage from ships. It is a potential source of both diseases and pests. In FY 1982 nearly 49 million pounds of it was removed from aircraft and destroyed. Another 3 million pounds was removed from ships.

The number of pests and diseases to keep out is numerous--and so are the ways in which they can get in.

For example, foot-and-mouth disease could be in the soil on the shoes of an incoming traveler who visited a farm in a foot-and-mouth disease country.

Moreover, international travelers don't realize how much damage one orange or piece of homemade sausage could cause.

Most are not intentional smugglers. In fact, most of them want to do the right thing.

Take one elderly gentleman from the Philippines arriving at Chicago's O'Hare airport. He had the longest, skinniest can PPQ inspectors ever saw--five feet long! In this five-foot-long can he had a five-foot-long sausage. He had made the can himself--by soldering together several cans to get one long enough to accommodate his five-foot sausage. He had heard that we required meat to be in cans. But he was only half-right. We require that it be in commercial cans, with a label saying it doesn't need refrigeration.

But even a sausage or fruit unintentionally brought into the country could damage our agriculture.

#### ECONOMIC LOSS POTENTIAL

How much damage? What kind of economic losses could we suffer?

Let's reflect on that for a moment.

A single sausage could bring in an animal disease like African swine fever that could devastate our pork industry--and raise consumer pork prices.

Or it could bring in another animal disease like foot-and-mouth...which would cost some \$10 billion over several years to eradicate.

Or a single piece of fruit like an orange could bring in a fruit fly like the Mediterranean fruit fly that would cost millions of dollars to eradicate.

In fact, that's probably how the Medfly got into California a few years ago--in a piece of fruit slipping by undetected into Los Angeles or San Francisco. The cost to eradicate: Over \$100 million.

But that was just the direct cost. To that \$100 million you have to add another \$40 to \$100 million in market losses. No producing groves were actually infested, but there were losses due to quarantine actions.

And there were job losses...people who picked and packed the fruit...and truckers who hauled it. The work these people lost has to be counted on the loss side as well.

Still, the cost of eradication was really a bargain...because the value of what was at stake was much greater than the cost of eradication. What was at stake was a California fruit crop worth an annual \$5.4 billion--and ultimately the fruit and vegetable crop of the entire country.

If the Medfly had really got foothold in this country--if we had allowed it to establish itself over its entire ecological range, it would have infested over 80 percent of this country's citrus--at an annual cost of \$524 million. This is considerably more than just the one-shot \$100 million-plus eradication cost.

As I said, truly a bargain!

So PPQ people stand guard at ports of entry, our first line of defense. But if that line of defense is breached, they undertake to eradicate the invading pest--as they did with the Medfly, working together with the states and industry.

#### SURVEY AND DETECTION

But they do still more.

They conduct surveys that detect a pest like the Medfly in the first place.

In fact, over two million hours a year is spent surveying for plant pests in the United States.

Let me just say a few words about one aspect of our surveying activity.

Until recently, most our survey users would get only uncoordinated and unstandardized local survey data. But now our computerized "National Cooperative Plant Pest Survey and Detection Program" (NCPSPDP) is changing that. It is now beginning to give users regional data--more quickly and increasingly in a standardized form. More and more states are participating in the program. As of last month, 39 had submitted data so far this year.

Here is how it works:

States submit standardized data on pests and other crop performance factors to a central APHIS computer at Fort Collins, Colorado. Then states get summary printouts updating them on regional pest situations. At the same time, we in PPQ--in the national program--use it to detect exotic pests early, before they can spread or do any economic damage.

Also, the data is useful for exports. Our phytosanitary officers use it when issuing phytosanitary--plant health--certificates--to exporters. The certificates assure foreign countries that the plants and crops we export are pest- and disease-free.

Surveys, computerized or otherwise, have always been an indispensable tool in our pest eradication or management programs. Surveys enable us to first detect a pest. Then they tell us how far it's spread. And they tell us how well we are doing when we are eradicating or managing it.

#### TO ERADICATE OR NOT TO ERADICATE?

So the pest has been detected--and we are carrying out surveys to find its limits. Then we have to decide at some early point whether we do away with the pest--eradicate it--or manage it--that is, learn to live with it.

Sometimes we can't eradicate--either because the pest has spread too far or because the technology is not available. Or industry finds that it can live with the pest--that eradication is uneconomical. Then we manage the pest. We devise a management scheme to help growers and others live with it.

The choice is sometimes clear--at other times not so clear.

Let me cite some examples.

#### ERADICATION

First--some eradication examples.

I have already cited our most recent and biggest--and most publicized--eradication effort: the Medfly campaign in California...how costly it was...and how much more costly it would have been if we had not eradicated.

But here we are discussing the choice...and the choice was eradication.

No way could we have accepted simply managing such a devastating pest, given a five-billion-dollar-plus-a-year industry in California. Living with the pest was out of the question.

So we eradicated the Medfly.

The effort was a big one by any measure. It lasted some 27 months. It enlisted the efforts of thousands of people, officials and citizens alike. There were 4,000 people directly involved--from the federal level on down to the state, county, and town. At its height aerial spraying covered 1,400 square miles a week. Nearly 4,000 square miles in seven counties were quarantined.



Another example--the khapra beetle, a tiny but destructive pest of stored grains. We eradicated it in the 1950's. But it remains a serious threat because much of the world remains infested.

In the last three years, khapra beetle slipped past our defenses. It was detected in some 20 locations across the United States--warehouses, spice factories, and even a grocery store.

Again, no question about the choice. It was eradication. Working with local authorities and civic groups, we ironed out all problems and successfully cleaned up each infestation.

Sometimes it's a question not only of developing an eradication technology--but also of demonstrating that it works.

That's what we did in the case of the boll weevil, the cotton pest.

Boll weevil was eradicated from Virginia and part of North Carolina in a three-year trial program using both pesticides and non-chemical means. The trial program showed that eradication could be carried out over a wider area. This is significant because the pest remains a problem in the rest of the Cotton Belt.

The trial program convinced North and South Carolina cotton growers--so much so that they voted in a referendum to foot 70 percent of the eradication costs. So eradication is now underway in both of these states, in cooperation with the Southeastern Boll Weevil Eradication Foundation, Inc. We estimate it will take two years to complete the program. When it's over, the boll weevil's northern range of economic damage will be confined to the northern border of Georgia.

#### MANAGEMENT

But let's say we decide that we manage rather than eradicate. What happens then?

Pest management follows a pattern. First, detection. Then delimiting surveys...finding the extent of the pest spread. Next, regulation, to limit the spread. Finally, determining the best way to cope with the pest--and that's management.

There are many ways to manage a pest--by biological as well as chemical means.

For example, you can use a parasite to combat a particular pest.

When the cereal leaf beetle entered the United States, pesticides failed to eradicate it. And regulations didn't stop its spread. So researchers went to the beetle's native Europe where they found tiny wasp parasites that control the beetle there. After testing to make sure the wasps wouldn't

themselves become pests, they introduced them into the United States. One of our labs began mass-rearing them. The result is that today in most areas the cereal leaf beetle is only a minor pest.

Parasites are used to manage other pests--for example, the citrus blackfly in Texas and Florida.

But often controlling a pest requires a combination of methods.

Take the golden nematode--a pest of potatoes in parts of New York. Working with New York state agricultural officials and growers, we are controlling it with a combination of pesticides, resistant varieties, and and regulations governing the movement of potatoes, soil, and other items that could spread it.

Regulations play an important part in the management of the gypsy moth.

The gypsy moth, an eastern pest, has been spreading westward in recent years--as far west as California. It hitchhikes on outdoor articles of American families moving from the east to points west.

How to prevent spread of the pest?

Obviously we would like to reduce and eliminate outlying infestations where we find them...and we are doing that in several states through aerial spraying and other means. At the same time, we need to limit the pest's spread. So we sought to regulate the movement of outdoor household articles--because we found it accounted for about 70 percent of the spread.

We now have the regulations. They require moving families to have documentation showing that their outdoor goods were inspected by a USDA-approved method. Self-inspection is one option. But if a family moving is stopped and its outdoor articles are found to be infested, a fine can result.

Some pests cause such severe and widespread damage that growers acting individually cannot control them. Grasshoppers, for example, can destroy millions of acres of livestock forage during outbreak years...and cause massive damage to crop land as well. PPQ helps keep damage down by cooperating with the states and ranchers in aerial treatment of hard-hit rangeland.

#### REGULATION

A few words about the mechanics of getting regulations on the books.

Regulation is an important interim step--to limit the spread of a pest while you're trying to figure out how to eradicate or manage it.

In consultation with industry and other experts, we draft the regulations. We get as much input as possible. On issues of wide interest, public hearings are held to make sure all interested parties have their say. We invite written comments as well.

Finally, the regulations become effective after being published in the Federal Register--and our information people issue a press release, or other materials like pamphlets if needed.

But sometimes there is no time. Action has to be taken immediately. It's an emergency. So we issue emergency regulations first. Then we go ahead with perhaps public hearings and the rest of the procedure, after which permanent regulations are issued.

One final point on regulations. We don't keep regulations on the books forever. We amend them--and when they're not needed any longer we abolish them. We do not want to add to the burden of unnecessary government regulation.

#### OTHER ACTIVITIES

Besides pest exclusion, survey and detection, eradication, management, and regulation, we do some other important things.

I already mentioned plant health certification--or phytosanitary certificates. We issue well over 100,000 such certificates each year.

We are into "endangered species." We cooperate with the U.S. Department of the Interior, which has the responsibility of carrying out the provisions of the Endangered Species Act. The Act deals, among other things, with the import and export of "endangered" plant species. The Department of the Interior issues the permits required for the international movement of such species--but we are the ones who do the enforcement--through our PPQ port inspectors, who are trained to identify the regulated species.

Another important activity: Seed inspection. PPQ inspectors sample seed imported from foreign countries to make sure it is accurately labeled and free of noxious weeds. At some ports we cooperate with U.S. Customs in carrying out this particular activity.

Finally, as Mr. Hawkins has noted, we are doing a great deal of work overseas.

PPQ has regional offices the world over--in Central and South America, in Europe, and in the Pacific. Many of our people are now in our own foreign service. They help preclear agricultural products destined for the United States...tulip bulbs in Holland, fruit from Australia and Chile, and fruit and vegetables from Mexico. They are helping Mexico and Guatemala fight the Medfly. They serve as technical advisors for USAID programs overseas.

In effect, our overseas activities serve to extend our first line of defense. For our part in PPQ, we believe it makes a great deal of sense to head off exotic pests before they get to our ports of entry.

But whether abroad or at home, our aim in PPQ is to work together with our sister service, Veterinary Services, as part of the APHIS team, to protect U.S. agriculture and assure Americans a bountiful food supply.



John K. Atwell, Animal and Plant Health Inspection Service

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As indicated in Mr. Hawkin's remarks, Veterinary Services handles the animal health aspects of the APHIS mission--"Protecting American Agriculture." In many ways, our concerns in VS are similar to those of PPQ. However, our main concerns are primarily with the diseases and pests of livestock and poultry.

In VS, we have particular concern about the way animal diseases spread and the threats that are magnified by today's complex, rapid and large-scale movements of livestock and poultry. When animals move, they can also move diseases. Our job is to find infected or infested animals, to stop unauthorized movements, and to eliminate outbreaks. In the case of highly communicable diseases, this means tight surveillance and quick response.

This, of course, is an oversimplification. Our programs are varied and complex, designed for a variety of animal health concerns. In some areas we interact with Plant Protection and Quarantine activities. Others are handled directly through the Veterinary Services organization. Many programs are cooperative efforts between VS and state animal health officials. And we are active in international animal health matters.

We interact with the Plant Protection and Quarantine organization largely in the regulation of imported animals and animal products, and in the working relationship of our port veterinarians with PPQ's Agricultural Quarantine and Inspection organization.

America's animal health necessarily depends on the protection we provide against foreign diseases and pests. Accordingly, we administer federal regulations for the importation of animals and animal products. These cover the diseases of concern to us; the countries that are affected; and the prohibitions, restrictions, quarantines and certifications necessary to assure protection. They also regulate the processing, treatment and certification of animal products from other countries.

The real test of these regulations comes at the U.S. port of entry. There, the PPQ inspectors provide the first line of defense against unauthorized entry of animals or their products. The VS port veterinarian is an integral part of this team. He inspects imported animals, poultry and birds, and supervises quarantines. He provides back-up for other animal health matters at the port of entry.

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And when animals are exported, he makes the final inspection and authorizes departure.

Regulations provide the authority, or muscle, to guard against animal diseases. APHIS port personnel make sure that the muscles are used. This is our surveillance.

But surveillance does not stop at the port of entry. It is followed up throughout the livestock and poultry industries--at markets and stockyards, and in individual investigations of disease outbreaks. Surveillance continues right up to slaughter, with reports coming back to us from USDA meat inspectors.

We rely on surveillance to warn us of any disease--domestic or foreign--that is of concern to us. This is particularly important in the case of exotic diseases. U.S. livestock and poultry are highly susceptible, and our marketing system makes rapid spread likely, unless we identify outbreaks quickly.

When an outbreak occurs--and outbreaks inevitably will occur--APHIS immediately responds by calling up its Regional Emergency Animal Disease Eradication Organizations, or READEO's. These are task forces comprised of federal, state, and military personnel trained and ready to implement every necessary aspect of disease eradication--quarantines, diagnosis, stop-movement orders, investigations, epidemiology, destruction of infected herds or flocks, cleaning and disinfection, and enforcement.

READEO's have had practical experience against exotic Newcastle disease in poultry and Venezuelan equine encephalitis in horses. But to keep up our readiness, periodically we conduct test exercises that are as close as possible to the real thing.

All of these activities add up to the maximum effort we can make to keep out exotic diseases and pests, and if a disease occurs, to eradicate the same. However, this cannot be the end of our efforts. We need to know what is happening elsewhere in the world. We need surveillance of diseases in other countries, new activity, or spread to new areas or countries. And where a disease presents an imminent threat to our own country, we should act to help remove or reduce that threat.

To this end, we are participants in international animal health organizations, we are partners in bilateral or multinational disease eradication or surveillance agreements, and we help in emergency eradication programs. This includes keeping foot-and-mouth disease from spreading from South America to Central America, eradicating screwworms in Mexico, and participating in international campaigns to eradicate African swine fever in the Dominican Republic and Haiti.

Our concern over foreign diseases does not imply freedom from problems with domestic livestock diseases or pests. The history of APHIS and its predecessor agencies is the history of many sustained campaigns against domestic plagues and pests. We began a hundred years ago as the Bureau of

Animal Industry, or BAI, which was established in 1884 with the immediate objective of eradicating contagious bovine pleuropneumonia. Subsequently we took on Texas cattle tick fever, and have successfully eliminated at least thirteen major diseases and pests. The latest victory was against hog cholera, which was declared eradicated in 1978.

The patterns established nearly one-hundred years ago are still very much applicable today. The first chief of the BAI, Dr. D.E. Salmon, initiated the concept of cooperative state-federal agreements. Under this type of agreement, we and the states are partners. We in APHIS work closely with state veterinarians and their staffs. We adopt uniform methods and rules to guide our efforts, and we work jointly to assure compliance.

In spite of past victories, we have plenty to do against domestic diseases. We are fighting tuberculosis and brucellosis in both swine and cattle, pseudorabies in swine, scrapie in sheep, equine infectious anemia in horses.

Under the cooperative state-federal programs, we employ a variety of weapons against domestic diseases.

We regulate interstate livestock and poultry movements. We establish requirements for testing, health certification and identification in connection with such movements. We set standards for certain types of vaccination, and the rules governing movement of vaccinated animals.

State veterinarians regulate intrastate movements, and in many states the operation of markets.

We maintain surveillance to detect infection. This may include herd testing in high risk areas, monitoring livestock markets and exhibitions, and tracing reports of meat inspectors back to an animal's farm of origin.

And if we find disease outbreaks, we impose quarantines and eliminate the infection. Often this means destruction of the infected herd or flock, or it could mean removal of infected animals and an extended period of testing and retesting under quarantine. In many cases indemnities are paid to help compensate owners for their losses.

Our epidemiologists trace movements of animals into and out of infected herds and flocks.

Beyond the responsibility for interstate movements, we also provide certification of livestock, poultry and semen for export. In this context, and with much of the above, I should cite our reliance on accredited practicing veterinarians, who perform much of the inspecting, testing and vaccination that underlies our programs. APHIS veterinarians monitor and endorse the health certification performed by these veterinarians. This is backed up by the work of approved veterinary diagnostic laboratories, including APHIS National Veterinary Services Laboratories.

APHIS animal health responsibilities extend to some other broad areas. One is the licensing of veterinary biologics manufacturers and the products they sell in interstate commerce--such as vaccines, bacterins, and toxins.

Another area of special responsibility is the administration of animal welfare laws and regulations. APHIS regulates laboratories using certain animals for research, wholesale dealers in certain warmblooded animals, animal exhibitors, animal transporters, and trainers and exhibitors of walking horses.

Time does not permit an encyclopedic picture of APHIS-VS activities. The important question here, however, is: What are the impacts of animal diseases and pests?

Hard figures are not easy to come by, and our estimates might undergo wide fluctuations under a real-life epizootic. But the most important thing to remember is that our animals are highly susceptible to exotic diseases. Our outstanding animal health is perhaps our greatest hazard, and for that reason it is more important than ever that we maintain the highest possible standards of protection.

Here are a few "for instances."

During a major outbreak of exotic Newcastle disease in the poultry industry of southern California in 1972-74, direct eradication costs were \$56 million. It is estimated that if exotic Newcastle disease were to become established here, it would cost the U.S. poultry industry about \$280 million per year.

During our seventeen-year campaign to eradicate hog cholera, direct program costs required about \$140 million in total. Had we not undertaken this effort, and carried it to successful completion, continuing unabated losses over the same period would have amounted to \$1.5 billion.

If foot-and-mouth disease were to get into the United States, and we had to slaughter just 1/10th of one percent of our susceptible livestock to control the disease--a realistic figure--the cost would be \$54 million annually.

If we were to experience only a small outbreak of African swine fever, involving only several counties in one state, the cost would be \$7.3 million.

The effect of any of these diseases on our exports would have an equally chilling effect. For the same reason that we deny imports because of foot-and-mouth disease, hog cholera, and African swine fever, other nations would almost entirely refuse our exports. For example, today we are denied a world market for our sheep because of the disease of scrapie, which exists in our native sheep population.



Rather than accept what we feel would be overwhelming costs, if a single major disease were to become established, we insist on strong surveillance and regulation at U.S. ports of entry. This in the face of demands for easier entry, with less stringent inspections. Long ago we determined that it is better to eradicate highly communicable, destructive livestock diseases, than to "live with them." As I indicated in our experience with hog cholera, the costs are unacceptable.

My discussion of the potential costs of exotic diseases should not divert us from the fact that our domestic livestock diseases, in spite of overall generally excellent health conditions, impose significant costs when we export livestock. This results partially from the high standards we insist on when qualifying export shipments, and partially from standards imposed by the receiving nations.

We require a high standard of health for all livestock that we certify for export. And we also insist that exporters and the certifying accredited veterinarians qualify export shipments according to additional requirements imposed by the receiving country. These conditions are contained in international agreements negotiated directly with animal health officials of the other nation.

This causes more work, but it assures a high degree of acceptance of exported U.S. livestock, poultry and semen. We intend to continue honoring these agreements, and where the requirements seem excessive, we attempt to negotiate more reasonable terms.

An example is our recent set of agreements, which we negotiated in May with representatives of the People's Republic of China. Previously there were no established agreements, and would-be exporters suffered. The agreements we made, however, proved to be economically unfeasible; so we returned to China, and through negotiations and amendments appear to be on the road to practical, workable requirements.

Certain diseases that currently exist in this country are causing us difficulty in the export market. European nations, in particular, and some others, are resisting U.S. exports because of bluetongue in cattle, and because of bovine leukosis.

Bluetongue, an insect borne disease, is enzootic. It will take more research, improved testing procedures, and perhaps negotiations to overcome some of these problems.

Bovine leukosis is now subject to rapid diagnosis because of new testing procedures. This has encouraged some European countries to require herds of origin to be free of the disease. This can be done, but not economically without considerable export incentive. In dealing with both of these diseases, we may well be dealing with economic, as well as health, considerations. As with all of our export health agreements, negotiations are the route to follow in assuring equitable, feasible arrangements.

These discussions of import and export health considerations do not begin to touch the most significant area of all, the production of livestock and poultry for domestic markets.

Domestic diseases such as tuberculosis, brucellosis and pseudorabies command much of our attention, and demand considerable resources. However, with tuberculosis and brucellosis incidence currently at a very low level, eradication is within reach and feasible, if we will adhere to the methods and rules we have adopted.

With pseudorabies, we are on the verge of determining the practicality of eradication, or the optimum measures for control. Currently, we have underway a yearlong survey of pseudorabies prevalence, based on laboratory testing of a statistically sound sampling of all swine sent to slaughter. This will give us a sound basis for determining the impact of the disease. And we now have pilot eradication projects underway in limited areas of Illinois and Iowa, with possible additional projects in other states.

What of the total disease picture? There are many livestock and poultry diseases that do not attract significant attention, for which we have no eradication or control programs. There is a broad area of unknowns in the field of animal health on U.S. farms and ranches. We have concluded that the nation's chief animal health agency should know more about the total picture. We should not be surprised by new developments. We should know what animal diseases are costing us, where and with what prevalence they are occurring.

So, just two months ago, we launched the first pilot projects in a comprehensive National Animal Disease Surveillance system (NADS). Teams of veterinarians and other technicians have been trained in Ohio and Tennessee for a long-term program of monitoring health conditions on a randomly selected sampling of farms in those states. Refinements, computer programming, additional pilot projects and improved methodology must follow. We are hoping that by the year 1989, we will be able to report a working National Animal Disease Surveillance system.

The future holds many other developments, much of it still in the laboratories. However, if the rest of our political society holds together, we should be able to look forward to better disease surveillance worldwide, to exotic new vaccines based on genetic engineering, to greater international cooperation, perhaps to expanded disease eradication programs, regionwide in other continents.

Only recently, Chile was recognized as having eradicated foot-and-mouth disease, the first South American nation (excepting Panama) to mark such an achievement. With better vaccines, international cooperation, and strengthened animal health regulations, such achievements might occur with increasing regularity.

APHIS will remain in the forefront of these efforts.

PROGRAM OUTLOOK FOR  
CROP INSURANCE IN 1984  
PRESENTED BY: MERRITT W. SPRAGUE,  
MANAGER, FCIC  
NOVEMBER 1, 1983



As we move into 1984, there are some exciting and significant changes to the Crop Insurance program. The 1980 Act authorizing our activities set the stage for a vastly expanded and improved program designed to be the primary disaster protection plan for American agriculture.

#### Program Expansion:

Expansion efforts have been dramatic. We've moved from offering crop insurance under less than 5,000 county programs in 1981 to over 18,000 in 1984. Most of the expansion of insurance has come in pre-existing lines of business; however, a number of new programs have been developed. Within the past twelve months, new programs have been implemented for Citrus Trees, Fresh Vegetables, and Hybrid Seed Corn.

The Board of Directors has approved for use in 1984, a separate Table Grape contract and new programs for Popcorn, Walnuts, and Cranberries. Priorities have been established for development of new offers to be made, probably in 1985, to producers in Hawaii (probably Sugarcane, Pineapples, Papayas, and Macadamian Nuts) and producers of American Pima Cotton, Malting Barley, Fresh Market Sweet Corn, Prunes, Onions, and Horticultural Specialty Crops. We expect further expansion of existing lines of business as we move to offer universal coverage to as many producers as possible of a wide variety of crops.

#### Improved Service to Producers:

Private insurance companies are delivering an increasing amount of crop insurance under reinsurance agreements with FCIC. Nearly 35 percent of the crop insurance in force in 1983 was serviced in this manner - up from 3 percent in 1981.

Nearly all the contracts on FCIC paper were serviced by professional private insurance agents and adjusters operating under agreements with the Corporation. Only the home office insurance functions relating to such contracts are now handled by federal employees. We continue to employ a limited field staff whose primary function is to support our private sector partners when problems arise.

The transition to a private sector delivery system is proving to provide steadily improving service to policyholders.

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### Improved Contract Provisions:

Perhaps the greatest task facing FCIC the past three years was the need to design contracts and coverages which truly met the needs of producers for protection. As the contracts were revised, they were placed in an easy-to-read format to ease increased understanding of the provisions.

Most contracts include changes designed to increase the protection available to producers when disaster beyond their control strikes.

For example:

1. The reduction in indemnity provision when a near total loss led a producer to not harvest his acreage was eliminated.
2. Replant provisions have been added to several policies.
3. Quality adjustments have been added to fairly reflect the reduced value of low quality production.
4. Stage guarantees, where applicable, have been increased to recognize current production costs.
5. The late planted option allows insurance protection when adverse weather prevents timely planting.

The single most significant change has been a move toward yield guarantees being based on actual production history rather than an average of a group of producers. The Individual Yield Coverage program (IYC) is now an option to contracts other than those using what we call the Grower Yield Certification (GYC) approach which also is based on individual production records and used for most specialized crops. In 1984, cotton and rice producers will have guarantees based solely upon individual production history (no area coverage). We expect the producers of Corn, Grain Sorghum, Tobacco, Peanuts, and Forage insured in 1985 to be offered only similar yield guarantees.

This change from our traditional way of doing business promises to reach a huge number of producers who have needed risk protection for years but who rejected crop insurance as a poor value priced package for their operation.

For the first time the better than average producer is to be offered yield guarantees which fairly reflect his capability and which are equitable in relation to his less productive neighbor. For the first time the premium rates will reflect the risks in a truly fair fashion. The loss experience of the past was based upon adverse selection and low participation rates and that experience affected rates to an unacceptable extent for many of our nation's best producers. We must have actuarial soundness! We must set rates which will generate sufficient premium income to pay the losses over an extended period of time. I am just as concerned, however, with rate equitability as rate sufficiency and so is the Director of the Corporation's Actuarial Division.

What is the Purpose of the Crop Insurance Program?

Perhaps I Should State What It Is Not!



### It Is Not A Cow To Be Milked Regularly!

Every loss paid will ultimately reflect the cost to the producer. Payment of many little losses can be compared to matching quarters with policyholders. He wins one - we inch up the rate - get it back in the next few years - administrative and loss costs balloon - everyone loses.

### It Is Not A Means To Guarantee A Profit!

Profit margins in production agriculture are so narrow today that marketing skill is essential for success. The rate for a policy which would guarantee net income would be so high that a participant wouldn't have net income when he otherwise would have.

### It Does Not Relieve A Producer Of The Necessity To Do The Best Job Possible!

The cost is based upon each producer making the maximum effort which is physically and economically feasible. Our rules requiring recommended management practices will be enforced. If a producer's crop is reduced because of weed competition, he will be subject to a guarantee reduction for uninsured cause of loss if his failure to follow recommended practices contributed to the loss. Failure to apply nitrogen to a corn crop or failure to use irrigation capability when required will be treated in a similar fashion. Last planting date provisions will be enforced. We will conduct whatever number of growing season inspections are necessary to assure compliance with contract provisions.

### What Then Is Crop Insurance?

It is an effective risk management tool for all producers. One that will keep a grower in business when conditions beyond his control significantly reduce his crops or destroy them completely.

It is a hedge against bad weather and other production problems. A small bet placed to protect a huge investment in a growing crop.

It is an investment that will pay off, rather than cost, over the long run. This is true because the federal premium subsidy and the administrative and operating expenses are paid by the United States Treasury.

It is protection against a catastrophe that might well put a producer out of business.

It is a quality product offered at a fair price.

### Why haven't producers been knocking down doors to buy crop insurance?

In many areas of the county, protection against the risks covered by crop insurance is not a generally accepted business practice. Producers insure their houses, barns, livestock, and machinery - they purchase liability insurance, they own health, life, accident, and property casualty policies - yet fail to cover the greatest risk they accept - those related to weather. I see this situation changing! As lenders and extension agents, as farm managers, and as good successful farmers support, encourage, and recommend crop insurance to the producers within their sphere of influence.

PROGRAM OUTLOOK FOR  
CROP INSURANCE IN 1984  
PRESENTED BY: MERRITT W. SPRAGUE,  
MANAGER FCIC  
NOVEMBER 1, 1983



AS WE MOVE INTO 1984, THERE ARE SOME EXCITING AND SIGNIFICANT CHANGES TO THE CROP INSURANCE PROGRAM. THE 1980 ACT AUTHORIZING OUR ACTIVITIES SET THE STAGE FOR A VASTLY EXPANDED AND IMPROVED PROGRAM DESIGNED TO BE THE PRIMARY DISASTER PROTECTION PLAN FOR AMERICAN AGRICULTURE.

#### PROGRAM EXPANSION:

EXPANSION EFFORTS HAVE BEEN DRAMATIC. WE'VE MOVED FROM OFFERING CROP INSURANCE UNDER LESS THAN 5,000 COUNTY PROGRAMS IN 1981 TO OVER 18,000 IN 1984. MOST OF THE EXPANSION OF INSURANCE HAS COME IN PRE-EXISTING LINES OF BUSINESS; HOWEVER, A NUMBER OF NEW PROGRAMS HAVE BEEN DEVELOPED. WITHIN THE PAST TWELVE MONTHS, NEW PROGRAMS HAVE BEEN IMPLEMENTED FOR CITRUS TREES, FRESH VEGETABLES, AND HYBRID SEED CORN.

THE BOARD OF DIRECTORS HAS APPROVED FOR USE IN 1984, A SEPARATE TABLE GRAPE CONTRACT AND NEW PROGRAMS FOR POPCORN, WALNUTS, AND CRANBERRIES. PRIORITIES HAVE BEEN ESTABLISHED FOR DEVELOPMENT TO NEW OFFERS BEING MADE, PROBABLY IN 1985, TO PRODUCERS IN HAWAII (PROBABLY SUGARCANE, PINEAPPLES, PAPAYAS, AND MACADAMIAN NUTS) AND PRODUCERS OF AMERICAN PIMA COTTON, MALTING BARLEY, FRESH MARKET SWEET CORN, PEARS, ONIONS, AND HORTICULTURAL SPECIALTY CROPS. WE EXPECT FURTHER EXPANSION OF EXISTING LINES OF BUSINESS AS WE MOVE TO OFFER UNIVERSAL COVERAGE TO AS MANY PRODUCERS AS POSSIBLE OF A WIDE VARIETY OF CROPS.

#### IMPROVED SERVICE TO PRODUCERS:

PRIVATE INSURANCE COMPANIES ARE DELIVERING AN INCREASING AMOUNT OF CROP INSURANCE UNDER REINSURANCE AGREEMENTS WITH FCIC. NEARLY 35% OF THE CROP INSURANCE IN FORCE IN 1983 WAS SERVICED IN THIS MANNER - UP FROM 3% IN 1981.

NEARLY ALL THE CONTRACTS ON FCIC PAPER WERE SERVICED BY PROFESSIONAL PRIVATE INSURANCE AGENTS AND ADJUSTERS OPERATING UNDER AGREEMENTS WITH THE CORPORATION. ONLY THE HOME OFFICE INSURANCE FUNCTIONS RELATING TO SUCH CONTRACTS ARE NOW HANDLED BY FEDERAL EMPLOYEES. WE CONTINUE TO EMPLOY A LIMITED FIELD STAFF WHOSE PRIMARY FUNCTION IS TO SUPPORT OUR PRIVATE SECTOR PARTNERS WHEN PROBLEMS ARISE.

THE TRANSITION TO A PRIVATE SECTOR DELIVERY SYSTEM IS PROVING TO PROVIDE STEADILY IMPROVING SERVICE TO POLICYHOLDERS.

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## IMPROVED CONTRACT PROVISIONS:

PERHAPS THE GREATEST TASK FACING FCIC THE PAST THREE YEARS WAS THE NEED TO DESIGN CONTACTS AND COVERAGES WHICH TRULY MET THE NEEDS OF PRODUCERS FOR PROTECTION. AS THE CONTACTS WERE REVISED, THEY WERE PLACED IN AN EASY-TO-READ FORMAT TO EASE INCREASED UNDERSTANDING OF THE PROVISIONS.

MOST CONTRACTS INCLUDE CHANGES DESIGNED TO INCREASE THE PROTECTION AVAILABLE TO PRODUCERS WHEN DISASTER BEYOND THEIR CONTROL STRIKES.

FOR EXAMPLE:

1. THE REDUCTION IN INDEMNITY PROVISION WHEN A NEAR TOTAL LOSS LED A PRODUCER TO NOT HARVEST HIS ACREAGE WAS ELIMINATED.
2. REPLANT PROVISIONS HAVE BEEN ADDED TO SEVERAL POLICIES.
3. QUALITY ADJUSTMENTS HAVE BEEN ADDED TO FAIRLY REFLECT THE REDUCED VALUE OF LOW QUALITY PRODUCTION.
4. STAGE GUARANTEES, WHERE APPLICABLE, HAVE BEEN INCREASED TO RECOGNIZE CURRENT PRODUCTION COSTS.
5. THE LATE-PLANTED OPTION ALLOWS INSURANCE PROTECTION WHEN ADVERSE WEATHER PREVENTS TIMELY PLANTING.

THE SINGLE MOST SIGNIFICANT CHANGE HAS BEEN A MOVE TOWARD YIELD GUARANTEES BEING BASED ON ACTUAL PRODUCTION HISTORY RATHER THAN AN AVERAGE OF A GROUP OF PRODUCERS. THE INDIVIDUAL YIELD COVERAGE PROGRAM (IYC) IS NOW AN OPTION TO CONTRACTS OTHER THAN THOSE USING WHAT WE CALL THE GROWER YIELD CERTIFICATION (GYC) APPROACH WHICH ALSO IS BASED ON INDIVIDUAL PRODUCTION RECORDS AND USED FOR MOST SPECIALIZED CROPS. IN 1984, COTTON AND RICE PRODUCERS WILL HAVE GUARANTEES BASED SOLELY UPON INDIVIDUAL PRODUCTION HISTORY (NO AREA COVERAGE). WE EXPECT THE PRODUCERS OF CORN, GRAIN SORGHUM, TOBACCO, PEANUTS, AND FORAGE INSURED IN 1985 TO BE OFFERED ONLY SIMILAR YIELD GUARANTEES.

THIS CHANGE FROM OUR TRADITIONAL WAY OF DOING BUSINESS PROMISES TO REACH A HUGE NUMBER OF PRODUCERS WHO HAVE NEEDED RISK PROTECTION FOR YEARS BUT WHO REJECTED CROP INSURANCE AS A POOR VALUE PRICED PACKAGE FOR THEIR OPERATION.

FOR THE FIRST TIME THE BETTER THAN AVERAGE PRODUCER IS TO BE OFFERED YIELD GUARANTEES WHICH FAIRLY REFLECT HIS CAPABILITY AND WHICH ARE EQUITABLE IN RELATION TO HIS LESS PRODUCTIVE NEIGHBOR. FOR THE FIRST TIME THE PREMIUM RATES WILL REFLECT THE RISKS IN A TRULY FAIR FASHION. THE LOSS EXPERIENCE OF THE PAST WAS BASED UPON ADVERSE SELECTION AND LOW PARTICIPATION RATES AND THAT EXPERIENCE AFFECTED RATES TO AN UNACCEPTABLE EXTENT FOR MANY OF OUR NATION'S BEST PRODUCERS. WE MUST HAVE ACTUARIAL SOUNDNESS! WE MUST SET RATES WHICH WILL GENERATE SUFFICIENT PREMIUM INCOME TO PAY THE LOSSES OVER AN EXTENDED PERIOD OF TIME. I AM JUST AS CONCERNED, HOWEVER, WITH RATE EQUITABILITY AS RATE SUFFICIENCY AND SO IS THE DIRECTOR OF THE CORPORATION'S ACTUARIAL DIVISION.

WHAT IS THE PURPOSE OF THE CROP INSURANCE PROGRAM?

PERHAPS I SHOULD STATE WHAT IT IS NOT!



IT IS NOT A COW TO BE MILKED REGULARLY!

EVERY LOSS PAID WILL ULTIMATELY REFLECT THE COST TO THE PRODUCER. PAYMENT OF MANY LITTLE LOSSES CAN BE COMPARED TO MATCHING QUARTERS WITH POLICYHOLDERS. HE WINS ONE - WE INCH UP THE RATE - GET IT BACK IN THE NEXT FEW YEARS - ADMINISTRATIVE AND LOSS COSTS BALLOON - EVERYONE LOSES.

IT IS NOT A MEANS TO GUARANTEE A PROFIT!

PROFIT MARGINS IN PRODUCTION AGRICULTURE ARE SO NARROW TODAY THAT MARKETING SKILL IS ESSENTIAL FOR SUCCESS. THE RATE FOR A POLICY WHICH WOULD GUARANTEE NET INCOME WOULD BE SO HIGH THAT A PARTICIPANT WOULDN'T HAVE NET INCOME WHEN HE OTHERWISE WOULD HAVE.

IT DOES NOT RELIEVE A PRODUCER OF THE NECESSITY TO DO THE BEST JOB POSSIBLE!

THE COST IS BASED UPON EACH PRODUCER MAKING THE MAXIMUM EFFORT WHICH IS PHYSICALLY AND ECONOMICALLY FEASIBLE. OUR RULES REQUIRING RECOMMENDED

MANAGEMENT PRACTICES WILL BE ENFORCED. IF A PRODUCER'S CROP IS REDUCED BECAUSE OF WEED COMPETITION, HE WILL BE SUBJECT TO A GUARANTEE REDUCTION FOR UNINSURED CAUSE OF LOSS IF HIS FAILURE TO FOLLOW RECOMMENDED PRACTICES CONTRIBUTED TO THE LOSS. FAILURE TO APPLY NITROGEN TO A CORN CROP OR FAILURE TO USE IRRIGATION CAPABILITY WHEN REQUIRED WILL BE TREATED IN A SIMILAR FASHION. LAST PLANTING DATE PROVISIONS WILL BE ENFORCED. WE WILL CONDUCT WHATEVER NUMBER OF GROWING SEASON INSPECTIONS ARE NECESSARY TO ASSURE COMPLIANCE WITH CONTRACT PROVISIONS.

WHAT THEN IS CROP INSURANCE?

IT IS AN EFFECTIVE RISK MANAGEMENT TOOL FOR ALL PRODUCERS. ONE THAT WILL KEEP A GROWER IN BUSINESS WHEN CONDITIONS BEYOND HIS CONTROL SIGNIFICANTLY REDUCE HIS CROPS OR DESTROY THEM COMPLETELY.

IT IS A HEDGE AGAINST BAD WEATHER AND OTHER PRODUCTION PROBLEMS. A SMALL BET PLACED TO PROTECT A HUGE INVESTMENT IN A GROWING CROP.

IT IS AN INVESTMENT THAT WILL PAY OFF, RATHER THAN COST, OVER THE LONG RUN. THIS IS TRUE BECAUSE THE FEDERAL PREMIUM SUBSIDY AND THE ADMINISTRATIVE AND OPERATING EXPENSES ARE PAID BY THE US TREASURY.

IT IS A PROTECTION AGAINST A CATASTROPHE THAT MIGHT WELL PUT A PRODUCER OUT OF BUSINESS.

IT IS A QUALITY PRODUCT OFFERED AT A FAIR PRICE.

WHY HAVEN'T PRODUCERS BEEN KNOCKING DOWN DOORS TO BUY CROP INSURANCE?

IN MANY AREAS OF THE COUNTY, PROTECTION AGAINST THE RISKS COVERED BY CROP INSURANCE IS NOT A GENERALLY ACCEPTED BUSINESS PRACTICE. PRODUCERS INSURE THEIR HOUSES, BARNs, LIVESTOCK, AND MACHINERY - THEY PURCHASE LIABILITY INSURANCE, THEY OWN HEALTH, LIFE, ACCIDENT, AND PROPERTY CASUALTY POLICIES - YET FAIL TO COVER THE GREATEST RISK THEY ACCEPT - THOSE RELATED TO WEATHER. I SEE THIS SITUATION CHANGING! AS LENDERS AND EXTENSION AGENTS, AS FARM MANAGERS, AND AS GOOD SUCCESSFUL FARMERS SUPPORT, ENCOURAGE, AND RECOMMEND CROP INSURANCE TO THE PRODUCERS WITHIN THEIR SPHERE OF INFLUENCE.



GLOBAL PERSPECTIVE FOR  
CROP INSURANCE IN 1984  
PRESENTED BY: E. RAY FOSSE,  
CROP - HAIL INSURANCE ACTUARIAL ASSOCIATION (RETIRED)  
NOVEMBER 1, 1983



During my tenure as Manager of Crop-Hail Insurance Actuarial Association (the national rating and statistical organization for private crop insurance) there was a steady stream of visitors from foreign countries. They were studying our crop insurance programs and systems, both federal and private, in the interest of application in their respective countries.

The interest of other countries in crop insurance derives from common problems and objectives but with varying orientations. In common, they seek to provide protection to producers from catastrophic losses caused by the perils of nature, using the vehicle of insurance. The motivation for providing such protection varies according to the degree of agricultural development in the respective countries.

In the countries with relatively well developed agriculture, the need of producers for protection arises out of high capitalization and cash inputs and the financial stress attendant to crop failure. This is characteristic of the United States condition and other countries which are more or less food-sufficient.

Many countries, as a matter of conscious national policy, seek to advance their agriculture from the level of subsistence farming to some degree of food self-sufficiency. In the process, capital is invested and production inputs are intensified. Insurance is conceived as a protection of the investment, even though the investment may be primarily by governments. Hence, another application of the adage that insurance is the handmaiden of capitalism.

The major problems of administering a comprehensive crop insurance program are (1) establishing coverages which serve the real needs of producers yet which are consistent with the theory of insurance, i.e., we insure against fortuities, not foregone conclusions; and (2) establishing premium rates which are equitable as between risk classifications, but in any event, are ultimately sufficient to meet the needs to which premium income is disposed. Irrespective of who pays the premium, it is not insurance if premium income does not equal or exceed indemnities within some reasonable time frame.

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Establishing coverage on a sound basis requires considerable historical data, particularly of two categories:

- (1) annual crop yields, preferably at the farm level
- (2) climatic history at the level of relatively small geographic areas.

It requires little imagination to realize the probable inadequacy of production records among producers operating at subsistence levels. Even in many developed countries, such as the United States where we have well advanced agricultural systems, the detail of production history essential to establishing correct coverages and rates is not commonly available, especially on a farm-by-farm basis (the exception in the United States is specialty crops for which marketing systems impel records of the kind which are essential to crop insurance actuarial work).

A major handicap to the introduction of crop insurance, then, is the inadequacy of data with which to develop sound coverages and rating systems. The problems of insurance are not insurmountable but in the absence of necessary data a trade-off is inevitable: conservative protection is offered until data is accumulated, most likely with excessive premium levels. The result may often be limited participation and of mostly marginal or sub-marginal producers.

Problems of administration are often more limiting than data for program design. Frequently, the government or government agency is the insurer and the most common characteristic is lack of discipline needed to maintain adequate premium levels and to keep politically convenient losses under control. This lack of discipline is reflected in the fact that commercial reinsurers have seldom continued to reinsure government insurers for very long. (There is no lack of discipline in the reinsurance market).

A second major problem arises from what I perceive to be an almost universal misconception of the functions of insurance when applied to growing crops. Most people purchase fire insurance on personal and real property but are satisfied that there is rarely a claim. But, somehow, when it comes to crop insurance, the premium is mentally placed on the input side of the ledger and regarded as unproductive if there is no claim within relatively few years. Unless crop insurance is regarded as a risk management tool, the best system is doomed to fail, and, to degenerate into an ill-disguised subsidy.

While the private sector in the United States has shared experience and counsel with foreign visitors, the Federal Crop Insurance Corporation (FCIC) has been actively involved in assisting foreign nations to analyze and establish crop insurance programs. It became involved in the foreign area in 1979 when it joined with Agency for International Development (AID) in a research and development project primarily focused on countries of Latin America. Under that project, intensive assistance was given three countries (Bolivia, Panama, and Ecuador) while more general assistance and contacts were maintained with some 30 others, who had or have since started programs of crop insurance.

Based on a review of the research findings, a decision was made in August 1983, by AID, the funding agency, to terminate that project. The reasons for discontinuation are related to the costliness and complexity of multiple peril crop insurance (MPCI).

A. The possibility of very large losses is so real and the amount so great that the less developed countries are often financially unable to cover the losses.

B. While commercial reinsurance capacity has been generally available for these countries, the fact that most of them insist on operating direct government insurers (rather than government reinsuring the private insurers) denies MPCI programs the bottom-line generated discipline needed to maintain adequate premium levels and to keep politically convenient losses under control. I am informed that, to date, almost all government-run MPCI programs which have used commercial reinsurance have abused it and lost their cover within a few years. Again, with reinsurance as with direct insurance, unless premium levels are sufficient to cover indemnities plus a margin, it is not insurance and programs will expire or degenerate into nothing but government subsidies to a few favored producers.

C. The administrative cost of providing crop insurance to very small subsistence farmers is prohibitive for both government and the producers. Research findings persistently indicate that in the less developed countries administrative costs exceed benefits; when the financial risk of catastrophic losses is added, such governments are unable to manage a viable program of crop insurance. In some cases, the insurance systems tend to be subverted and lead to a diminishing of the welfare of those farmers forced to participate. Other risk management tools (e.g.-- irrigation and improved agricultural practices) and ad hoc disaster relief programs seem to be preferable to MPCI in the subsistence farmer cases.

It is sad that even in the well developed countries there prevails the notion that government alone can do multi-peril type crop insurance better and at less cost than a partnership involving a government reinsurer and private insurers. Centuries of insurance history seem lost on the uninitiated, especially in the realm of crop insurance.

There are a few successful programs in the private sector: coffee in Jamaica, sugar in Mauritius, and export fruits in Chile. In these situations, we are encouraging farmers, processors and marketers to proceed on their own without government support. Once their programs are sufficiently well established they may wish to approach their governments with proposals for cooperative action as in the case here in the United States.



In the case of developed countries and commercial agriculture, the research indicated that either direct government insurance or the indirect method (i.e., reinsurance by government of private carriers) can be viable, although the former will be more expensive. We are maintaining useful contact with countries with indirect systems (Israel, South Africa, Spain, France, and Japan) and with those countries which are considering adopting the reinsurance model: Venezuela, Australia and Sweden. Of course, we continue to maintain close relations with countries such as Canada which use the direct model exclusively.

In summary, there are two points: (1) There is widespread interest in crop insurance as a national program of assuring viable agricultural economies. There are two major approaches, one in which government is the insurer, the other in which government is the reinsurer of private carriers. In almost all cases, public funds are engaged to pay the cost of administering crop insurance, and in many cases a part of the pure premium (cost of indemnities) is also financed with public funds. I suspect that in the well developed countries the success of the programs may hinge somewhat on the degree to which farmer paid premiums finance the programs. Somehow, there seems to be the human element of less caution about abuse if it costs little or nothing. (2) There prevails an inspiring degree of international cooperation and exchange of ideas and experience. The International Hail Association primarily deals with single peril coverages but has devoted attention to MPC I in their recent biennial conferences. At government levels, there is useful contact and sharing of ideas and experience. I expect a steady refinement and growth of crop insurance programs presently in existence as well as introduction of new programs on a continuing basis.



Robert B. Phelps  
Forest Service, USDA  
1984 Agricultural Outlook Conference, Session 26  
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Few timber products are consumed by individuals in the form in which they are initially manufactured. Instead, most move to various major markets where they are remanufactured or made a part of a product that is ultimately used by individual consumers. Thus, although consumer demand is the underlying force, direct demand for timber products is largely determined by the levels of activity in their primary end-use markets. So before discussing demands for the various products, I would like to briefly review recent trends in these markets and take a look at current estimates of their strength this year and early in 1984.

#### Domestic Markets

Activity in most major timber products markets in the United States increased fairly rapidly through the first half of 1983. However, early in the fourth quarter trends in several economic indicators, including a slowing in the gross national product and continuing high interest rates, suggest that growth in most markets may moderate somewhat late in 1983 and in 1984.

The gross national product, the most comprehensive measure of total economic activity, rose 9.7 percent at a seasonally adjusted annual rate to \$1,525 billion (1972 dollars) in second quarter of 1983. This was the most rapid single-quarter growth since the second quarter of 1978 and followed an increase of 2.6 percent at a seasonally adjusted rate in the first three months of the year. Late October estimates by the U.S. Department of Commerce put third-quarter GNP growth at a somewhat lower seasonally adjusted rate of 7.9 percent. Although this estimate is subject to revision, analysts feel that the economy has slowed somewhat. Most also expect that growth to moderate further in the fourth quarter and for the year to average about \$1,535 to \$1,540 billion (1972 dollars), roughly 3.5 percent above the GNP for 1982. Continued growth is expected in 1984.

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Trends in new construction, the largest market for lumber and plywood, vary somewhat with the type of construction. Production of new housing units, which accounts for over a third of the total annual consumption of softwood lumber and plywood, and for substantial amounts of the other major timber products, moved up strongly during the first 8 months of 1983. In August, housing starts reached a seasonally adjusted annual rate of 1,909,000 units, up 6 percent from July and the highest monthly level in more than 4 years. In September, however, starts declined sharply. Apparently in response to the increase in interest rates in the summer and to lagging sales in August, September starts dropped to a seasonally adjusted rate of 1,652,000 units, 13.4 percent below August and the smallest rate since April 1983.

Many analysts had been expecting a downturn in starts since the July increase in mortgage rates and were somewhat surprised that the decline had not begun in August. Most now anticipate a continuing decline in the level of starts in the final quarter of the year. This expectation is the result of a number of elements, including a 9 percent decline in the September seasonally adjusted level of new housing permits (which follows a 7 percent drop in August), a 5 percent decline in seasonally adjusted new home sales reported for August, and continued high mortgage interest rates. Because of rising starts and declining sales the unsold inventory of new single-family housing at the end of August was 297,000, up some 20 percent from August 1982, and estimated to be equal to a supply of more than 6 months at the current seasonally adjusted rate of sales. Based on these various trends, recent estimates of housing starts for 1983 range from 1,600,000 to 1,800,000 units with the consensus at about 1,700,000. Although this is still about 300,000 below the 2 plus million units started several years in the 1970's, it is more than half again larger than in 1981 and 1982 and would be the most units built since 1979. Shipments of mobile homes, a type of dwelling that many first-time home purchasers have turned to in recent years as costs for conventional houses increased, have also been rising and will be sharply higher than in 1982.

Analysts' estimates of 1984 housing starts vary, however, most currently see new home construction and sales continuing to be constrained by high interest rates early in the year. And although they expect some improvement in the second half, most forecast starts for the year to be near or only slightly above the total for 1983. Mobile home shipments are expected to follow the same general trends.

Through the first 9 months of 1983, one-family units composed about 63 percent of all private starts (seasonally adjusted basis), slightly above 1982 when 62 percent of the private units started were one-family. An increase in the proportion of this type of unit has special significance for the timber products industry because average per unit use of lumber, plywood, and other wood-based panel products is much higher than in multi-family units and mobile homes.

In contrast to housing, nonresidential construction activity declined sharply through the first 4 months of 1983. Since then, however, there have been marked improvements and in August the seasonally adjusted annual rate of expenditures for new nonresidential construction totaled \$104.7 billion (1977 dollars). This is almost 10 percent above the April volume, but still about 2 percent below August 1982. Much of the decline early in the year was in expenditures for nonresidential building construction--the major wood-using segment of the nonresidential market. Although interest rates remain relatively high, consumer expenditures for durable and nondurable goods have been rising and industrial capacity utilization has been increasing, reaching a 2-year high in September. As a result, recent surveys indicate that contract awards for future nonresidential construction were rising late in the summer. These data in conjunction with surveys of anticipated expenditures for new plant and equipment indicate probable increases in the months ahead. However, unless last quarter expenditures are particularly strong, expenditures for all of 1983 are unlikely to reach the total for 1982. Investment in plant and facilities should move up more rapidly in 1984 as the general economy continues to improve and production and consumption rise.

The index of industrial output--an important indicator of the demand for pallet lumber, container board, and some grades of paper--rose to a seasonally adjusted value of 153.7 (1967=100) in September. This was 1.5 percent above the index for August; and a continuation of the strong upward trend in evidence since the low reached in November 1982. Output of the furniture and fixtures industry--a major market for hardwood lumber, particleboard, and plywood--also increased rapidly, rising 19 percent in the first 7 months of the year to an all-time high before dropping in August to about the same level as in May. Container production, an important paperboard market, has been rising since late in 1982.

The August increase in total industrial output pushed the index to the highest level in more than 2 years. Moreover, economists feel that production in most industries will continue to rise in the months ahead although perhaps at a somewhat slower pace than in the first three quarters of 1983.

In summation, recent trends in the domestic markets for most timber products have been upward with good prospects for continued though possibly somewhat slower growth in the last quarter of 1983 and in early 1984.

#### International Markets

The United States is the world's leading importer of timber products--chiefly lumber, woodpulp, and paper and board from Canada and veneer and plywood from southeast Asia. The total value of these imports in 1982 was about \$8.4 billion, 3.3 percent of the value of all U.S. imports. In terms of roundwood equivalent, more than a fifth of our apparent consumption of timber products has been imported in most recent years.



The United States is also a major timber products exporter. In 1982, the total value of timber product exports was \$7.2 billion--about 3.5 percent of our exports. Although we ship a variety of wood products to many countries, our principal export markets are Japan for softwood logs and lumber, pulp chips, wood pulp, and paper and board products, and western Europe for wood pulp, paper and board products, and lumber and plywood.

International demand for many U.S. timber products, which had been generally trending up in the late 1970's, began to decline in 1980 as economic growth slowed in our major overseas markets. These trends have continued through mid-1983. Particularly important has been the long slump in Japanese housing, the principal market for most of the softwood logs and lumber imported from the United States. Also important has been the relatively weak but slowly improving economic conditions in some of our major European markets, particularly the United Kingdom and the Federal Republic of Germany and the strengthening exchange rate for the U.S. dollar. The outlook for international trade appears somewhat improved for most products in 1983, however, exports to most countries will likely be only marginally above 1982. International wood products specialists expect a continued slow improvement in 1984 if the economies of our major trading partners improve.

#### Timber Products Production, Trade, and Consumption

##### Softwood Lumber

In response to the sharply higher levels of housing starts, softwood lumber production in the first 7 months of 1983 was about 29 percent above that of the same months in 1982 according to data from the National Forest Products Association. Current expectations about housing and other markets indicate the likelihood of some slowing of output in the final months of the year, however, and production for all of 1983 is estimated at about 25.5 billion board feet some 21 percent above the 21.0 billion board feet produced in 1982 and the largest volume produced since 1979 (table 1.).

Imports, chiefly from Canada, are also expected to show some slowing late in the year, but overall to be up 27 percent to 11.6 billion board feet in 1983. This volume is second only to the 11.9 billion board feet imported in 1978. Exports are likely to increase about 5 percent to 1.7 billion board feet.

Based on the estimates of production, imports, and exports discussed above, apparent consumption (i.e., production plus imports minus exports) in 1983 is estimated at 35.4 billion board board feet--about 24 percent above 1982, and the highest volume consumed in U.S. domestic markets since 1979.



Table 1.--Wood products production, consumption, and trade

(1980-82 actual, 1983 projections)

Product	Year	Domestic Production	Imports	Exports	Apparent Consumption
Softwood lumber (billion bd. ft.)	1980	25.3	9.6	2.0	32.8
	1981	22.9	9.2	1.9	30.2
	1982	21.0	9.1	1.6	28.5
	1983	25.5	11.6	1.7	35.4
Hardwood lumber (billion bd. ft.)	1980	7.1	.3	.5	6.9
	1981	6.3	.3	.5	6.1
	1982	4.8	.2	.4	4.6
	1983	5.7	.2	.5	5.4
Softwood plywood (billion sq. ft. 3/8-inch basis)	1980	15.5	1/	.4	15.1
	1981	15.5	1/	.7	14.9
	1982	14.1	1/	.5	13.7
	1983	18.4	.1	.6	17.9
Hardwood plywood (billion sq. ft., 3/8-inch basis)	1980	1.0	1.2	1/	2.2
	1981	1.0	1.5	1/	2.4
	1982	.9	1.1	1/	2.0
	1983	1.1	1.6	1/	2.7
Particleboard <sup>2/</sup> (billion sq. ft., 3/4-inch basis)	1980	3.5	.3	.1	3.7
	1981	3.5	.3	.1	3.6
	1982	2.9	.3	.1	3.1
	1983	3.8	.3	.1	4.0
Hardboard (million tons)	1980	2.0	.2	1/	2.1
	1981	1.9	.2	1/	2.0
	1982	1.7	.2	1/	1.8
	1983	2.2	.2	.1	2.3
Insulation board (million tons)	1980	1.1	1/	1/	1.1
	1981	.8	1/	1/	.8
	1982	.8	1/	1/	.8
	1983	1.1	.1	1/	1.2
Pulpwood (million cords)	1980	88.6	1.6	3.7	86.5
	1981	85.3	1.5	3.0	83.9
	1982	83.4	1.4	2.4	82.5
	1983	90.0	1.5	2.0	89.5

1/ Less than 50 million square feet.

2/ Includes medium-density fiberboard.

3/ Less than 50 thousand tons.

Note: The projections shown for 1983 are based on the trends in the major markets discussed in this paper and should not be viewed as forecasts of actual volumes. Data presented are subject to rounding.

Present expectations about housing and other important markets indicate that a small rise in production, imports, and consumption is likely in 1984. Exports are also expected to increase.

On the strength of rising demand, softwood lumber prices increased rapidly through the first half of 1983. However, at mid-year prices peaked and have been declining over the past three months. The producer price index of softwood lumber in September stood at an index level of 361.4 (1967=100) (table 2). This was about 9 percent below the high for the year reached in June, but still 12 percent above the average for 1982. In October, prices were continuing to decline and no appreciable increase is likely for many grades if housing construction trends down in the last quarter.

#### Hardwood Lumber

Because of increased activity in its major markets, hardwood lumber production, orders, and shipments during the first 7 months of 1983 were sharply above 1982 levels. Output for the year is estimated at 5.7 billion board feet--19 percent above 1982.

Hardwood lumber imports through July were slightly above those in the first 7 months of 1982 and only a little strengthening is expected in the last half. The total for the year is thus estimated at 0.2 billion board feet. Data through July showed that exports were 20 percent higher than in the first 7 months of 1982. The year's total is expected to be 0.5 billion board feet, about 0.1 billion above the volume exported in 1982.

Apparent hardwood lumber consumption in 1983, based on the above estimates of production and trade, is estimated at 5.4 billion board feet, 17 percent above 1982. Anticipated growth in the important hardwood markets suggests that some increase in production and consumption is likely in 1984. Imports and exports are also expected to show a small rise.

In contrast to softwoods, hardwood lumber prices, as measured by the producer price index, have trended steadily up in 1983. Prices in September (index value 291.2, (1967=100)) were about 9 percent above those in January and 11 percent above the 1982 average. Some further increases can be expected, in late 1983 and in 1984, if demand continues up as expected.

#### Softwood Plywood

According to data from the American Plywood Association, total production of softwood plywood was sharply above year-earlier levels during the first 8 months of 1983. Although the Association expects some slowing in the last quarter, production will likely remain above last quarter 1982. As a result of these trends softwood plywood production in 1983 is estimated at 18.4 billion square feet, 3/8-inch basis, about 30 percent above 1982 output.

Table 2.--Producer price indexes for selected wood products

(1967 = 100)

Product	1980 annual	1981 annual	1982 annual	-----September-----	
				1982	1983
Softwood lumber	345.1	343.0	321.6	320.9	361.4
Hardwood lumber	252.0	255.2	262.4	262.5	291.2
Softwood plywood	308.8	306.5	282.1	282.3	306.3
Hardwood plywood	176.6	179.7	181.0	175.0	182.7
Particleboard <u>1/</u>	156.1	168.6	171.5	170.7	<u>3/</u>
Hardwood <u>2/</u>	187.4	217.9	228.5	232.1	234.7
Insulation board	208.1	242.4	250.9	253.4	265.8

1/ Corestock.2/ Type II, 1/8-inch.3/ Not available.

Source: U.S. Dept. Labor, Bureau of Labor Statistics.

Softwood plywood exports, which declined in 1982, are expected to increase from 0.5 to 0.6 billion square feet. Imports will likely also show a small rise to about 0.1 billion square feet.

With these levels of production and trade, apparent softwood plywood consumption in 1983 is expected to total about 17.9 billion square feet. The increase in housing and particularly in other markets in 1984 should result in an additional increase in production and consumption.

Softwood plywood prices as indicated by the producer price index peaked in July. Since then, prices have generally trended down, and in September the index was 306.3, 7 percent below July, but 8.6 percent above the 1982 average. Some rise is likely in 1984 as demand increases.

#### Hardwood Plywood

Hardwood plywood production is expected to total about 1.1 billion square feet (3/8-inch basis) in 1983, up about 24 percent from output in 1982. Trade data through late summer indicate that imports are likely to total 1.6 billion square feet, about 45 percent more than in 1982. Exports are expected to remain relatively small.

Given these trends in production and trade, apparent consumption of hardwood plywood in 1983 is estimated at 2.7 billion square feet, about 35 percent above 1982. A small increase in production and imports is likely in 1984 if the important markets follow the trends discussed earlier.

Hardwood plywood prices have also increased in 1983. In September, the producer price index was 182.7 (1967=100), about 4 percent above the index in January, but less than one percent larger than the 1982 average.

#### Particleboard

Activity in the major markets indicates that combined production of particleboard and medium-density fiberboard in 1983 will be up about 30 percent to 3.8 billion square feet, 3/4-inch basis. Data for the first 7 months of 1983 indicate that imports are likely to be 0.3 billion square feet. Exports are estimated at 0.1 billion square feet. Given these estimates, consumption will amount to 4.0 billion square feet, 28 percent above 1982. A somewhat smaller increase is likely in 1984.



### Hardboard and Insulation Board

Hardboard production in 1983 is estimated at 2.2 million short tons (6.6 billion square feet, 1/8-inch basis), about 29 percent above 1982. Imports are expected to total 0.2 million short tons with exports about 0.1 million short tons. Consumption, with these estimates of production and trade, would amount to 2.3 million short tons (6.9 billion square feet, 1/8-inch basis), about 28 percent above 1982.

Markets during the first half of 1983 indicate that insulation board production for the year will total about 1.1 million short tons (2.6 billion square feet, 1/2-inch basis)--about 30 percent more than in 1982. Imports are expected to total about 0.1 million tons and exports to be less than half as large. Consumption is consequently estimated at 1.2 million tons (2.8 billion square feet, 1/2-inch basis), about a third larger than in 1982.

If housing and manufacturing follow the trends outlined earlier, the demands for insulation board and particularly hardboard are expected to increase somewhat in 1984. Prices are also likely to follow the slow upward trends of the past two years, as indicated by the producer price indexes.

### Pulpwood

At the end of the first 8 months of 1983, paper and board consumption and production and consequently wood pulp consumption and production were strongly above the year-earlier pace. According to data from the American Paper Institute, the seasonally adjusted annual rate of paper and paperboard production through August was 63.2 million tons, up 7 percent from total output in 1982, and well ahead of the previous high of 62.3 million tons in 1981. Production of wood pulp--which currently constitutes about 78 percent of the fiber raw material consumed in U.S. paper and board mills--was about 4 percent above 1982 production. For many grades of paper and board, production and shipments were at all-time high rates through August, with the expectation of no appreciable downturn in the months ahead. Consequently pulpwood production (roundwood and chips) is expected to rise about 8 percent to 90.0 million cords, a new record volume.

Imports of pulpwood are expected to total 1.5 million cords and exports 2.0 million cords. These volumes are, respectively, about 7 percent above and 15 percent below 1982 imports and exports. Nearly all of the decline in exports is likely to be in chip shipments to Japan.

Apparent consumption for all of 1983, given the above estimates of production and trade, amounts to 89.5 million cords, 8.5 percent more than in 1982 and also a new record high in a trend that has been rising fairly steadily for decades. Prospective increases in economic activity suggest that consumption and production are likely to rise in 1984.

#### Softwood Log Trade

Softwood log exports during the first 7 months of 1983 were very close to the levels attained in the same period in 1982, as declines in shipments to Japan and China were offset by exports to Korea. Reports from the Far East indicate that exports to China were increasing in late summer, however, no strong upward trend is expected in Japanese imports because of continued depressed markets, especially housing. Exports to other areas are also unlikely to grow appreciably. Exports for the year, therefore, have been estimated at 3.2 billion board feet, 3 percent above shipments in 1982. The outlook for 1984 is also for a small rise. Imports of softwood logs have shown some increase and are expected total about 0.2 billion board feet in 1983.

#### Hardwood Log Trade

Hardwood log exports for 1983 are estimated at 0.1 billion board feet. Although the volume is small, most of the hardwood log exports in 1983, and in recent years, have been composed of quality oak, walnut, and other preferred species that are in short supply in the United States. These exports have thus been an important contributing factor to the large increase in stumpage and log prices for some domestic species.

Hardwood log imports in 1983 are expected to be close to 30 million board feet, about two thirds more than the volume imported in 1982.

#### Fuelwood

Current estimates indicate that fuelwood consumed for domestic heating and cooking has risen to more than 42.0 million cords per year in the early 1980's. Various surveys of the forest industries indicate that there have also been large increase in the consumption of fuelwood for industrial heat and power generation in the last few years. Apparently most of the wood being used for domestic purposes is produced by the consumers from urban areas, fence rows, dead trees and other similar sources not normally drawn upon as sources of industrial timber. Most of the growth in use by the forest industries has resulted from increased utilization of logging and mill residues.

Because most of the growth in fuelwood use has come from such sources there has so far been no significant impacts on industrial products such as pulpwood. This may in part reflect the generally depressed demand situation over most of the past 4 years. If the use of fuelwood continues to grow, it will undoubtedly begin to affect other products and especially so in the future when the demands for many of these products are expected to increase in response to rising economic growth.

### Summary

Given the trends in consumption, trade, and production for the various products discussed earlier, U.S. production and consumption of all industrial roundwood products, is expected to be sharply above 1982 levels. Total imports and exports, including the pulpwood equivalent of pulp, paper, and board also will be up. Some additional rise in consumption, imports, and production can be expected in 1983 if the various markets behave as discussed earlier. Exports also will likely show an increase.

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Forest Service, USDA  
1984 Agricultural Outlook Conference, Session 26  
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I am pleased with the opportunity to be with you today, and to have the opportunity to discuss the long term timber situation in the United States.

In the late 1970's we completed a comprehensive review of our present and prospective timber situation 2/. In the last year, we have taken a new look to update this analysis as a part of the work we have had underway to prepare the recommended Forest service program which will be submitted to Congress in 1985 as required by the Renewable Resources Planning Act. Although we have made changes to reflect new data, improved analytical methods, and different expectations about the future, the basic timber outlook is much the same.

In the future, as in the past, demands and supplies of timber will be largely determined by such things as growth in population, income, and economic activity; technological and institutional changes; energy costs; capital availability; and investments in forest, range, and water management, utilization, assistance, and research programs.

Present expectations about future changes in these basic determinants are not much different today from those in the late 1970's.

In the last five decades between the population of the United States has increased from 123 million to 234 million people. The latest estimates of the Bureau of the Census show population continuing to grow, with the mid-level projection reaching 304 million by 2030.

Economic activity, as measured by the gross national product in constant dollars (net of inflation and deflation), increased by over four times in the last five decades. In this period, there have been a major depression and number of recessions. In each case the economy has recovered, and it is expected to continue to do so in the future. The basic forces that bring about longrun growth are still there. Thus, the latest projections of the Bureau of Economic Analysis show that economic activity will nearly quadruple again by 2030. Total income available for spending (disposable personal income) is also projected to be nearly four times larger by 2030: per capita income will increase almost three times.

1/ The oral presentation at the Outlook Conference was made by Dr. Whaley. The public presentation was accompanied by slides.

2/ U.S. Department of Agriculture, Forest Service. An Assessment of the Forest and Range Land Situation in the United States. For. Res. Rep. 22. Govt. Print. Off., Washington, D.C. 352p.

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These projections of population, economic activity and income are a measure of the job ahead, we must not only meet the timber needs of another 70 million people but the demands of 304 million with purchasing power nearly triple that of today.

Of course, no one knows what the future holds, and what actually happens may be greatly different from what the above assumptions describe. However, these assumptions are consistent with general societal goals of full employment, continued economic growth, rising income, and current expectations about the future.

Although much is uncertain about the future we do know that the consumption of most timber products has been rising. Although there was no well defined upward or downward trend in lumber consumption between 1950 and 1980, pulpwood use increased nearly three times and plywood more than (figs. 5 and 6). The recent recession caused a short-term drop in consumption, and a substantial one for lumber and plywood. The use of roundwood for fuel followed a long downward trend through the mid-1970's. Since then, consumption has increased rapidly in response to rising costs of oil and natural gas; in 1980 it was five times that in 1976.

The longrun demands for all major timber products are projected to go up over the next five decades; as in the past, the demands for some products rise more rapidly than for others. Roundwood fuel demand, for example, rises dramatically at first and then after 2010 begins to decline, a response to projected increases in stumpage prices and fuelwood costs.

When the demand for all wood products is converted to cubic feet roundwood equivalent; that is, the volume of roundwood (round sections of trees) needed to produce the various products the total demand for timber rises from 15.7 billion cubic feet in 1980 to 25.8 billion in 2030. The demand for softwood timber goes up from 10.7 billion cubic feet in 1980 to 15.1 billion in 2030--hardwood timber demands increase from 5.0 to 10.7 billion.

A substantial part of the projected increase in softwood timber demand takes place by 1990. This is in response to an expected surge in homebuilding in the last half of the 1980's as the large numbers of people born during the 1950's and 1960's seek their own place to live. Pent-up demands resulting from the recent low levels of housing construction will also contribute to the surge in housing in the late 1980's. However, even beyond the 1980's softwood timber demands continue to rise and by 2030 will be some 1.4 times consumption in 1980.

Projected demand for hardwood timber will increase 2.1 times by 2030. This is largely due to growth in demands for pulpwood, fuelwood, and products such as pallets, railroad ties, and furniture.

Timber product imports, valued at \$8.4 billion in 1982, have been rising and have supplied part of the past domestic needs. Imports are expected to continue to go up until about 2010 when they level off at about 3.9 billion cubic feet, roundwood equivalent.

Exports of timber products, valued at \$7.2 in 1982, have also been going up, but because of offsetting trends--such as a decline in softwood log exports and a rise in woodpulp and paper--the recent levels of 2 billion cubic feet will not change much over the projection years.

Given the above trends, net imports--total imports less total exports--will increase to 1.6 billion cubic feet in 2030. This will satisfy part, but only a small part, of the higher demands projected for the future. Domestic forest lands must supply most of the demands.

We have a huge timber resource in the United States. Commercial timberlands--those that are capable of growing at least 20 cubic feet of wood per acre per year and not reserved for other uses contain some 792 billion cubic feet of roundwood. About two-thirds of this is in sawtimber trees (trees large enough to contain at least one log suitable for the manufacture of lumber). Another quarter is in poletimber trees (trees from 5 inches in diameter at breast height to sawtimber size, and now or prospectively suitable for industrial timber products). The remaining 10 percent of all roundwood volume is in rotten, cull, and salvable dead trees. Some of the latter may be suitable for lumber and veneer, but most of it is usable only for pulp, fuel, and other products where there are no significant log quality requirements.

Comparisons of net annual timber growth (total growth less mortality) with timber removals (volumes removed by timber harvesting, clearing, or changing land use) show that the hardwood forests and eastern softwood forests can support additional timber harvests. However, these balances will change, and future harvests, particularly in the decades beyond 2000, could vary over a wide range. Nonetheless, assuming that commercial timberland owners continue to respond to price and inventory changes and manage their timber stands much as they have in the recent past, timber harvests can be increased substantially in most regions during the next few decades.

Total projected softwood roundwood harvests rises from 9.6 billion cubic feet in 1980 to 11.9 billion cubic feet in 2030, an increase of 24 percent. Although the outlook is for increased softwood harvests nationally, there are important differences among the major softwood timber producing regions. The projected annual softwood timber harvests in the Douglas-fir subregion remain close to the 1980 level of 2.3 billion cubic feet until 1990 then decline slightly to about 2 billion cubic feet, a level that is roughly maintained through the rest of the projection period.

In contrast to the trends in the Douglas-fir subregion, softwood timber harvests in the South are projected to rise from about 4.1 billion cubic feet in 1980 to 7.3 billion in 2030.

Projected hardwood harvests will almost triple, rising from 3.4 billion cubic feet in 1980 to 9.4 billion in 2030. The largest increases will be in the South.

The data on projected harvests (supplies of timber) make it clear that there is not likely to be a physical shortage of timber in the United States in the decades immediately ahead, a prospect that exists in many regions of

the world. A comparison of projected supplies with projected demands shows, however, that the demands are rising faster than supplies. Thus, the outlook is one of increasing economic scarcity with rising timber and timber product prices.

Projected demands on domestic forests for softwoods rise to 11.7 billion cubic feet by 2000 and 13.9 billion by 2030. Projected supplies of softwood roundwood from domestic forests show more moderate increases to 11.0 billion cubic feet in 1000 and 11.9 billion by 2030.

In a competitive economy such as that operating in the timber sector, this means that prices will rise to the extent necessary to bring about an equilibrium between demands and supplies. For example, in the South, the real price for softwood sawtimber stumpage (trees standing in the forest) measured net of inflation or deflation will go up at an average rate of 2.1 percent a year during the five decades 1980-2030. In the Douglas-fir subregion of the Pacific Northwest, real prices rise more slowly, at an average rate of about 1.4 percent annually.

The outlook for the bulk of the hardwood timber--the smaller sized timber of common species--is somewhat better than that for softwood. However, after 2000, as hardwood inventories begin to show substantial declines in response to increased removals, stumpage prices move up. The upward price pressures are likely to be strongest in the North Central region.

During recent decades, there have been inventory pressures on high quality preferred hardwood species--such as select white and red oak, walnut, hard maple, and black cherry. The increases in stumpage prices that occurred in this period for the preferred species have reflected this situation. Such increases are likely to continue.

Rising stumpage prices will, of course, be reflected in prices of timber products. For example, softwood lumber and plywood prices measured in real terms both increase at annual rates of 1.3 percent over the projection period. Real price increases for hardwoods average about 0.8 percent per year for lumber and 0.2 percent for plywood.

The findings of the assessment are based on assumptions and projections of a large number of demand and supply determinants such as economic activity, housing construction, import duties, export volumes, management intensity on private lands, National Forest harvests, and commercial timberland acreages. It is possible that these determinants can be quite different in the future from what has been assumed. Expected future levels of these determinants also change with time--some of the current expectations vary considerably from those prevailing in the late 1970's when the analytical work was underway.

Changed future expectations about housing and some of the other demand determinants that have become evident since the 1979 Assessment analysis was completed have been incorporated in the demand projections presented above. No changes were made in the basic timber resource projections, excepting (1) those for the Douglas-fir subregion which were changed to reflect new data on the timber resource in western Washington, (2) timber harvests for the National Forests which in most regions were held at the levels prevailing in the late 1970's, and (3) some adjustments reflecting new assumptions on prices.



There are, however, some recent developments which suggest that it may be necessary to consider changed expectations about management on private ownerships. In the South, for example, some of the newest Forest Survey data on the timber resource and some of the first preliminary results from new resource projection systems now being developed indicate that management on forest industry lands may be even more intensive than that assumed in our latest resource projections. This would result in higher softwood timber inventories and supplies over the projection period. On the other hand, the same data and analyses indicate that part of the forest industry lands may not be suitable for intensive softwood management, and that softwood timber inventories and supplies on the farmer and other private ownerships are likely to be below the projected levels in the 1979 Assessment. Further, preliminary results from an analytical system we are developing to project changes in commercial timberland areas and data in studies such as the "1980 Appraisal" prepared by the Soil Conservation Service, suggest that the losses by 2030 of commercial timberland may be considerably larger than the 36 million acres we have been assuming.

The new projection systems are not yet developed to the point where they can be used in making revised timber resource projections. When this development work is completed, and a new resource data base compiled, projections of changes in the timber resource may be different from those we are currently using.

We now have a new study underway of the timber situation in the South, in which we will prepare revised projections. This is a joint Forest Service/forest industry/State effort, similar to the study of the economic opportunities for management intensification that we collaborated on a few years ago.

Although there was not an adequate basis for further changes in the resource projections, the effects of different assumptions on management intensity, harvest levels, and other supply determinants have been simulated for timber demands; stumpage prices; softwood lumber production, prices and imports; and growing stock inventories. The effects of different assumptions on demand determinants such as economic activity, housing construction, import duties, and export volumes have also been simulated.

As might be expected with more intensive management on forest industry lands or higher harvest levels on the National Forests, the projected increases in stumpage and product prices are reduced. On the other hand, if higher exports and greater losses of commercial timberland are assumed, stumpage and product prices will rise beyond the projected levels.

It is, of course, possible to simulate a future in which prices will not rise. If we assume, for example, that we will simultaneously have low timber demands, intensive forest management on all ownerships and high product yields, prices will remain relatively stable. Such assumptions are, however, logically inconsistent. For example, the resulting stable prices would eliminate price incentives for more intensive management and increased product yields while at the same time increasing the demand for timber products.



In addition, and much more to the point, we know of no new analyses or data which would support assumptions that timber demands will be lower, management more intensive on all ownerships, and product yields higher than those we are currently using as the basis for the Forest Service outlook.

In summation nearly all of the simulations that have been tested indicate that the Nation is faced with the prospect of continuing and substantial real increases in stumpage prices for most species and sizes of timber, and in the prices of most timber products. And the increases will very likely be largest for softwood sawtimber; high-quality hardwood sawtimber of preferred species; and the products, mainly lumber and plywood, made from this timber.

This in effect tells us what we can expect if we continue to manage and use our forests much as we have during the last few decades. But we think we can change this outlook--there are some important reasons to do so. The economic, social, and environmental costs associated with such as future are simply too high.

Consumers--and this includes everyone in the society--will be most adversely affected by price increases. By 2030, they will pay several billion dollars more for the timber products and substitute materials needed to produce the goods they will consume. Prospective home buyers will be most affected. For example, the projected real increases in softwood lumber prices will cause a reduction in home building by 2030, below the levels that would have been attained without the price increases. The size and quality of the units that are built will also be adversely affected.

As stumpage and timber product prices rise relative to other materials, use of substitute products such as concrete, steel, aluminum, and plastic will increase above the levels that would have otherwise prevailed. And as production of these substitutes is stepped up, more and more nonrenewable resources, including the ore and fossil fuels used in their production, will be removed from the country's finite store of these materials.

In addition, the mining, industrial processing, and power generation associated with increased use of timber substitutes will result in more air and water pollution. Thus, as timber prices go up, environmental costs will also rise.

Since the timber sector operates in a competitive economy, as prices move up, consumers simply use less. These reduced demands will be felt in the mills manufacturing lumber, plywood, and pulp products. For instance, by 2030, softwood lumber production will be several billion board feet below the volume that would have been demanded without real price increases.

Exports of most timber products are determined largely by the capability of United States producers to compete on a price basis with producers in other countries. Consequently, rising real prices will also constrain the country's timber export potential.

Reductions in domestic and export markets will affect employment. Employment in the timber industries in 2030 will be nearly a hundred thousand person-years below the levels that would exist without the real price

increases. Since losses in one industry affect many related jobs in other industries, eventually as many as a quarter of a million workers could be affected. Equally critical, these losses will be concentrated in the forested areas in rural communities which are chronically burdened with high unemployment.

Rising real prices will also affect the standing timber resource. Owners will increase harvests as prices go up, and as harvests rise, net annual growth and inventories will be changed.

The largest impacts will be on forests in the South. By 2030, growing stock inventories on private ownerships in the South will be 45 percent below that projected without rising real prices and assuming recent trends in management. The rising prices will, of course, induce more intensive management with an associated increase in net annual growth. But the intensification in management is likely to be limited, and significant effects on net annual growth and inventories in the South may not be evident until late in the projection period.

The decline reflects, in part, the pine regeneration problem with which has been evident for some time. A large proportion of land from which pine is harvested is simply not regenerated to pine. Much of the South's present pine stands resulted from natural seeding on abandoned cropland. Unless owners deliberately regenerate pine after harvests, the natural succession is to oak-pine or hardwoods.

Let me emphasize that these projections simply show us where we are heading. We do not really expect softwood inventories to drop as shown in figure 15, or that prices will rise to the extent our projections show, because we have many opportunities to change such prospects. More specifically:

1. Timber supplies can be extended by:

- Increasing the useful life of wood products by preservative treatments; improving designs of new structures, and renovating and maintaining existing structures rather than replacing them.
- Improving efficiency in harvesting, milling, construction, and manufacturing.
- Utilizing unused wood materials such as logging residues; treetops and limbs; rough, rotten, and salvable dead trees; trees in urban areas, fence rows, and the low productivity forest areas; and urban wood wastes.

2. Net annual timber growth can be increased by:

- Regenerating nonstocked and poorly stocked commercial timberlands, harvesting and regenerating mature stands, and converting existing stands to more desired species.
- Applying intensive timber management practices such as species and spacing regulation, fertilization, and use of genetically improved trees.

3. Harvests from the existing timber resource can be increased by:
  - Accelerating harvests on National Forests in Washington, Oregon, northern California, northern Idaho, and western Montana that have large inventories of old-growth softwood timber.
  - Increasing softwood and hardwood timber harvests on forests in the East.

In these latter cases, sustaining increased harvests on the National Forests in the West and on the forest lands in the East beyond a few decades will require large investments in more intensive management programs to increase net annual timber growth.

- Using management and harvesting practices to prevent or reduce losses caused by natural mortality (suppression), undesirable vegetation, wildfire, insects, diseases, and poor logging practices.

Only part of the biological opportunities to increase net annual timber growth can be expected to yield an acceptable rate of return on the investments necessary to put them into practice. But the joint Forest Service-forest industry-State study completed a few years ago showed that the economic opportunities are large. For example, there are opportunities which would yield 4 percent or more measured in constant dollars (net of inflation or deflation) on 168 million acres of commercial timberland. This represents about 35 percent of the Nation's total. With treatment of these acres, net annual timber growth could be increased by 13 billion cubic feet, a volume equal to about three-fifths of the net annual timber growth.

Most of the economic opportunities for increasing timber growth are in the South. And most of these opportunities, some 89 million acres are on the nonindustrial private ownerships.

Similar economic opportunities occur on another 24 million acres in forest industry ownership. This also represents about two-thirds of the commercial timberland in that ownership.

While some additional economic opportunities exist on public ownerships, they are relatively small because public ownership of commercial timberland is quite limited in the South.

In appraising economic opportunities in the South, several factors must be kept in mind. First, the opportunities are estimates . . . based largely on the judgments of experts from universities, the Forest Service, and State forestry agencies. Second, they include all commercial timberland without regard to the size of tracts, objectives of the owners, accessibility, or other factors. So, the data are not precise measures of the economic opportunities.

Nonetheless, even after allowing for uncertainties, it is evident that large opportunities do exist to invest in timber management practices that will yield good rates of return and result in major increases in softwood supplies. It is also clear that we are not taking advantage of the opportunities. We are largely letting natural successional forces determine the kind of forest we will have in the future. If this trend continues, the South's fourth forest may largely be a hardwood forest.



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### Introduction

The value of world agricultural trade is expected to decline in 1983 for the second year in succession. Factors contributing to this decline are poor world economic conditions, liquidity and debt servicing problems in many developing and centrally planned economies and good crops in some key importing countries. Agricultural trade should pick up in 1984, particularly overall prices but there is no cause for great optimism as many of the factors evident during the downturn will still be present.

Commensurate with the weak agricultural trade situation, export competition has been intense and has brought into sharp focus the plethora of protectionist policies around the world and the issue of what should be done to improve the agricultural trading situation. In this paper I want to first summarise some of the main features surrounding the outlook for the major commodities as seen from an Australian perspective and then concentrate on three main points:

- first, that international economic activity and world monetary developments play a crucial role in the prices for our primary commodities;
  - .. that is, the aggregate demand for commodities is crucial and agriculture gets caught up in these business cycles like any other sector;
  - .. this emphasis on demand has particular implications for the appropriate policy response to improve the trading situation.
- second, that, in the medium term, the prospects for growth in world agricultural trade are not all that bright unless there is substantial and sustained world economic growth. Only in some areas of the world can we be optimistic about growth in demand for agricultural commodities.
- third, that inappropriate domestic agricultural policies are the fundamental cause of the agricultural trade problems.
  - .. reform of these domestic policies is the key to success, but how to achieve reform is a complex issue.

### Summary of Outlook for Major Commodities

In international terms, there has been some recovery of major commodity prices during 1983 although the strong U.S. dollar has meant that U.S. dollar export

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prices have remained low. Although the U.S. drought has radically changed the feed grains and oilseed outlook, the wheat market continues to be plagued with the burden of surpluses. The following is the summary situation from Australia's perspective:

Beef: Total slaughter in Australia in 1983-84 is forecast to fall by 17 percent to 7.5 million head. Total production is expected to decline to 1354 Kt with total exports declining by 20 per cent to 465 Kt (shipped weight). Australian exports to Japan should remain around 90 Kt and to the USA 260 Kt are forecast, giving estimated arrivals and stock released from bond in the USA in 1983 of 288 Kt. With Australia's voluntary restraint level of 272.2 Kt, a small volume should be placed in bond storage in the USA for release after 1 January 1984. Preliminary calculations indicate that Australian entries of beef and veal in 1984 will be approximately 260 Kt - well below Australia's traditional share of a preliminary estimate of the trigger level in 1984. At this stage, we do not anticipate that restraints will be necessary in the U.S. market in 1984. Near term price prospects have eased as a result of U.S. drought conditions and increased supplies of meat, particularly pork following high grain prices and pig herd liquidation. Higher feed grain prices have already reduced placements on feed and we expect the combination of this factor and continuing economic recovery to eventually lift prices later in 1984. The prospect of a weaker \$US is adverse for Australia beef exporters as is the possibility of a substantial liquidation of the U.S. dairy herd.

Wheat: Australia's production this year is forecast to be a record 19 Mt - up significantly from our low drought affected production of 9 Mt last year. With Australian wheat supplies reasonably secure and abundant, the outlook for 1984 will depend on demand factors for our wheat and until we get a clear picture of Northern Hemisphere crop prospects, the outlook remains somewhat uncertain. World production in 1983/84 is expected to be another record of some 486 Mt, and with consumption less than production for the third successive year, world closing stocks in 1983/4 are forecast to increase to about 118 Mt. World wheat stocks might well have reached more than the record surplus of 1970 were it not for the increased feed wheat demand created by the severe drought effects on the 1983 U.S. corn and sorghum crops. Demand remains constrained and purchases by major buyers such as the USSR, China and India have been less than usual in recent years. Unless production drops sharply in 1984, there is every chance of a worsening wheat surplus in 1984-85.

Feed Grains: The international feed grain outlook has been altered dramatically by the devastating summer drought here in America. Of course, the improved market situation has been at the expense of the drought affected producers. The large world coarse grains stocks have been reduced and there has been a tightening in available supplies. However world consumption is not expected to rise appreciably in 1983/84. The outlook for 1984, as we see it, is that U.S. farmers will step up production after the PIK program and the drought. With good weather we could be back in a surplus situation in 1984.

Wool: Wool is much more significant to Australia than to the USA. Demand is expected to improve as the international economy continues to strengthen. Further, production in Australia is expected to be 3 percent down on last year due to the 1982-83 Australian drought and we, in addition, expect supply from other major apparel wool producing countries to fall. Because of these factors, the average price in Australia for 1983-84 is forecast to rise by around 13 percent to 510c/kg clean on a market indicator basis.

Sugar: Although sugar prices have improved over the last six months in response to adverse seasonal conditions, earlier in 1983, in some major producing countries, they are still at historically very low levels. Going into the 1983-84 season, record stocks of 38 Mt overhang the market. Although sugar production in 1983-84 is expected to fall by up to 6 Mt to 93 Mt, consumption is expected to rise to 96 Mt. Prospects of only a limited reduction in stocks in 1983-84 should prevent any substantial upward movement in world prices. The world sugar market is therefore likely to remain depressed through 1984.

Dairy: Australian production of dairy products in 1983/84 is forecast to rise by around 4.2 per cent at a time when world dairy prospects are decidedly pessimistic. Excess production and mounting stocks of product, especially cheese are depressing prices. The most significant feature about the dairy situation is, of course, the massive government intervention that occurs in practically every major producing country. Stocks of butter in the EEC and the U.S. have risen to 750 kt and 270 kt respectively. Despite these high stock levels, production continues to rise in the EEC while output in the U.S. is forecast to decline only slightly in 1984 in response to lower support levels, high feed prices and the U.S. dairy 'paid diversion' scheme.

#### Summary of Key Factors Affecting Short Term Trade Prospects

In a nutshell, 1983 has been overall another grim trading year for agriculture with slack demand for products due to the sluggish world economy and high stocks of most storable commodities. These factors have been exacerbated by domestic agricultural policies which, for the most part, have prevented the necessary adjustments and an improved competitive position by exporters. There have, however, been some brighter spots. Prospects for feed grains are now better as a result of the adverse seasonal conditions here in the USA combined with the effects of the PIK program. Added to this the world economy is beginning to recover, albeit slowly in Europe and Japan. This recovery should help strengthen demand and is an appropriate point to discuss the first of the three points mentioned earlier, viz the importance of international economic developments and world monetary conditions.

#### International Economic Developments and World Monetary Conditions

If we look at figure 1, we can see how the index of all commodity prices has varied since 1975. This figure reports all commodity prices including non-food items. I could have used just food items as it follows the all items index closely. However, for illustrative purposes it is better to use the all items index.



Take in figure 1

It can be seen from figure 1 that there have been two periods of depressed prices, with the most recent one being the trough of 1982.

Figure 2 shows the percentage change of money supply as measured by M1 for OECD countries as a whole. As can be seen from figure 2 there is a close correlation between the peaks and troughs with those on the commodities graph with a lag of about 12 months.

Take in figure 2

Many factors in this link between money supply and commodities prices are involved but it is not necessary to discuss them in depth in this paper (see Bond, Vlastvin and Crowley (1983) for a discussion of the processes at work). The linkages are crucial for the general macroeconomic debate and in particular how much is real activity affected, and effects on financial markets and the implications for changes in interest rates and hence also capital flows and exchange rates which impinge directly on prices of traded commodities. However, the important feature of this relationship is not so much the close correlation in itself but the lag of 12 months and the fact that the causality from changes in money supply through to commodity markets is primarily through the demand side.

The apparent linkage between money supply, economic activity and commodity prices is a crucial point and it means that the agricultural outlook and trade prospects are very importantly caught up in these international developments. The link between changes in world GDP and changes in world trade are also seen by referring to figure 3.

Take in figure 3

Typically, world trade changes by a greater degree than does GDP and the very large, sustained decline of recent times is illustrated clearly by this graph. While the graph refers to both agricultural and non-agricultural trade, it is important to realise that often it is non-agricultural trade items that are exchanged for food and those prospects are also crucial.

Turning to the link between these monetary developments, interest rates, international activity and exchange rates, the strong U.S. dollar has hit hard on all U.S. export industries including the U.S. rural industries. Our expectations are that with the pick up in economic activity, the record U.S. trade deficit, and a forecast rise in the rate of inflation, the U.S. dollar will weaken. This weakening will have the effect of enhancing the competitive position of U.S. exporters on world markets but at the same time other exporters to the U.S. market, for example beef exporters, will be affected. By way of digressing here for a moment it is important that people realise that it is the real exchange rate that is important for the competitive position of farmers on world markets and not the nominal rate. If we examine what has happened to the nominal rate adjusted for inflation differentials (that is, the real exchange rate) we find that the appreciation or loss in real competitive position is less than suggested by the nominal exchange rate movement. Essentially this is because American rates of inflation have recently been below most of her trading partners.

### Export Market Prospects

To see the key issues affecting world agricultural trade it is necessary to refer developments over the last decade.

The volume of world import trade in agricultural products rose 55 per cent between 1970 and 1981. The greatest growth was recorded in the developing countries, where volume of imports more than doubled, and the centrally planned economies (CPEs) where they rose by over 90 per cent. This compares with the Western developed countries where the rise was only about one third.

The area which recorded the highest growth rate over the period was the Near East (Middle East plus Egypt, Libya, Sudan and Afghanistan) where the volume of imports almost trebled between 1970 and 1981. The bulk of this increase occurred post-1973 presumably reflecting the impact of increased oil revenues.

In the case of the developed group of countries the rate of growth in the volume of agricultural imports contracted sharply in the latter half of the period (1976-1981). This was the exact reverse of the situation in the developing countries group and the CPEs where there was a marked acceleration in agricultural imports in the period 1976-1981.

By contrast, between 1970 and 1981 the volume of world agricultural exports rose by just over 60 per cent with the greatest growth being recorded in the developed market economies. The most notable was the growth in North America (112 per cent) and in Western Europe (105 per cent). Over the same period exports from Oceania (principally Australia and New Zealand) rose by a modest 24 per cent.

It would appear that the bulk of the increase in world trade in the period 1970 and 1981 was generated by import demand from the developing countries (notably the oil-rich Middle Eastern nations) and the CPEs, especially the USSR. The growth in demand from the developed nations has been relatively slight.

This points up the importance of the developing countries (especially the OPEC members) and the USSR in bolstering the growth in world agricultural trade over the past decade or so.

It also raises the question of what is likely to happen should demand from these two sources contract.

This could occur in response to

- falling oil revenues in OPEC countries due to depressed level of world economic activity and high prices leading to greater reliance on alternative sources of energy as well as conservation.
- an increase in the level of self-sufficiency in the CPEs (especially the USSR).

It is unlikely that any decline in demand from these sources would be offset by an increase in imports by the developed countries. Given such a situation, downward pressure on international market prices could be expected.



The problem would be exacerbated by a continuation of the steady upward trend in agricultural supplies from Western Europe (notably the EEC) and the United States since over the past decade or so much of the increase in world agricultural supplied can be attributed to these two sources.

The slowing of growth in trade in agricultural commodities in the early 1980s is very striking. Given the current world trading environment, there is a strong likelihood that world agricultural trade will grow less rapidly in the remainder of the 1980s than during the 1960s and early 1970s.

If we look around world markets the following picture emerges:

- the previous high growth in food imports in the centrally planned economies is not likely to be repeated due to changing policies in those countries, slower income growth and balance of payments problems
- .. a big question mark hangs over future grain imports by the USSR and they could be a contracting market for grain. This judgment is based on minor improvements in the efficiency of the Soviet livestock and grain sectors and slower growth than anticipated by the Soviet Government in per person consumption of livestock products. It is natural also to expect policies to move away from dependence on import supplies following the grain embargo.
- .. We also judge that Chinese grain imports will not rise much above current levels in the next few years. This is based on research that indicates the increase in imports between 1977 and 1981 was the result of increased emphasis on cash crops and reduced emphasis on grain.
- debt problems also paint a bleak picture for many less developed countries, especially in Latin America
- .. for many of these countries, merely servicing that debt would represent more than one hundred per cent of their export earnings. For example, at the end of 1982, Mexico (one of America's large markets for commodities) had debt servicing levels that were 126 per cent of export earnings. By mid-year generally falling interest rates and re-scheduling of loans had eased this situation but clearly these LDC's will not be high growth markets for imports of commodities or food products until these debt problems are overcome.
- for the EEC, the indications are that policy change, unfortunately, will be very slow.
- .. a lot of pressure has been placed on the European Community by major exporters of food, to address the problem of the farm subsidies and excess production but so far virtually no progress has been made
- .. the possibility remains that the EEC will be a contracting market for the diminishing food imports they now take as they seek to solve their budget problem

- .. these EEC policies are crucial and are returned to later. Suffice to say for now that the EEC is not a growth market and, without more dramatic policy changes than currently envisaged, will be a source of even more competition to major exporters.
- the Middle East and other oil exporting countries have been growth markets but the current oil glut has led to balance of payments problems for some of these countries
- .. while the Middle East still represents a growth market for Australia and other exporters, the rates of growth have tailed off considerably and the short term prospects are somewhat diminished.
- the countries with the best growth prospects are those in East and South-East Asia
- .. the BAE has recently completed a study on the prospects for our food products in South-East Asia and East Asia
- .. that assessment basically confirms our earlier view that there are good prospects in that region of the world. In particular, there are good prospects for wheat exporters to Indonesia and a wide variety of high-value agricultural products to Taiwan, the Republic of Korea, Malaysia and the city states
- .. however, upon close examination of the individual commodities and the markets, we are less optimistic than we were say a year or two ago
- The growth of some markets such as Japan has slowed markedly. Some further gains are likely in feed grain and concentrate imports and also through gradual relaxation of policies such as beef quotas.

#### Domestic Agricultural Policies

I would now like to pick up the fundamental nature of our trading problems on world markets. I have already mentioned the importance of the EEC Common Agricultural Policy for agricultural trade, although the EEC is by no means the only group intervening and regulating agriculture. The important point to remember is that the lion's share of local production in the major food markets of the USA and EEC is sold on the respective domestic markets. Wheat in the USA would be an exception, but in general it would not be unusual to find that a 1 per cent change in the domestic consumption or production of a commodity leads to a 5 per cent to 10 per cent change in the exportable surplus of that commodity. The primary purpose of these domestic agricultural policies is to meet certain domestic objectives; and trade objectives are not the primary purpose of the policies. The appropriateness of these domestic objectives have been questioned widely, but the essential issue that is becoming more widely realised is that, with few exceptions, whatever the domestic objectives are, they are being pursued with inappropriate policy instruments.

At the heart of the problem is the question of sovereignty of a country's internal agricultural policies with individual countries considering their sovereign right to establish a particular agricultural policy framework and direct resources towards agriculture. In turn trade policies have had to be developed to defend or realise these internal agricultural policies.

That is, the trade difficulties are only the symptom or the by-product of the problem caused by pursuing domestic objectives by inappropriate domestic policy instruments. Generally these inappropriate policies take the form of price intervention and seek to shield farmers from market realities. Commonly, domestic support programs take the form of indexation of prices or cost-of-production pricing. The difficulty with this approach is that it gives an incentive to produce beyond the market demand, leads to overproduction encouraging large surpluses and a loss in competitiveness by reducing the incentives for farmers to make the necessary adjustments. The realities are, however, that the higher the price support, the higher will be the cost of producing the marginal bushel or other unit of agricultural output. Farmers have demonstrated that they will produce output cheaply when prices are low. The opposite applies with high prices. In essence, cost of production pricing or indexation focusses only on the supply side of the equation. However, as demonstrated before, demand is also crucial for determining commodity prices; the only valid price to choose which is not going to lead to difficulties in the longer term and which will avoid these trade problems is where demand and supply are in balance - at the market clearing price.

In saying that the market clearing price is the appropriate price level, I am not necessarily advocating that there should not be intervention in the market or that intervention will not persist, since the realities are that it will. But the key is to get these domestic policies tied to realistic developments in the market, whether it be by way of underwriting type schemes based on a moving average price formula as used for wheat in Australia, and as applied for soybeans in the U.S. or other mechanisms. The key feature is that the domestic price support program bears some resemblance to real world developments so that if prices do fall, farmers receive support when they need it most but if prices remain low there is a reduced incentive to produce, and there is the right encouragement to adjust at the margin and maintain competitiveness. That is, a self correcting mechanism is automatically built into the policy.

The experience in Australia suggests that a considerable degree of certainty can be achieved using a three year moving average of market prices to determine guaranteed prices, while this is disciplined to move in line with market prices over time. Thus, the support prices are market related, and their determination is moved out of the political bargaining arena. I believe there would be considerable merit in the U.S. evaluating closely its approach to fixing soybean prices and extending the moving average pricing method more widely when the next farm bill is written.

If this is the solution, then the next logical question is how to effect change in the major agricultural producing areas of the world where interventions are greatest.



As demonstrated before, the two large producing areas are the EEC and North America. The prospects for reform in these two areas are essentially different however due to one major factor, viz the fundamental nature of the two systems. In the USA for example while the problems are internal, the costs are also internal as well. This is not true for the EEC however where the problems are internal but the costs are external. That is, the economic costs to member countries can be externalised to someone else through the Community budget (Tangermann 1983). That is, a member country demanding better treatment for a product in which it has a special interest can receive a large reward but contributing only a small fraction of the cost. This means that strong incentives are built for each national government to strive for higher prices.

This point about the structure of the CAP system is important since the results of analysis performed by various researchers indicates a very large effect of the CAP on world prices and trade. Studies by Sarris and Freebairn (1983) for wheat, by Tyers and Anderson (1983) for wheat, coarse grains and beef, by Roberts (1982) for sugar, by Tangermann and Krostitz (1982) for beef all show the CAP has adverse effects on world market prices by reducing their level and having a destabilising influence. The results generally indicate that the protective policies of the EEC have depressed world market prices by amounts broadly within the range of 9 to 18 per cent. This is not to simply point the finger at the EEC in this regard since all domestic governments intervene to greater or lesser extent but the simple fact remains that people do not change unless there is an incentive to change and as presently structured there is no incentive for the member States to change the CAP in any fundamental way.

How did this situation arise? The objective of the EEC system of agricultural support was to achieve insulation from import competition through variable levies, to provide a safety valve if surpluses were produced through enabling exports with the aid of restitutions (subsidies) and to ensure that the institutional prices set were supported domestically through intervention purchasing when necessary. These various measures were compatible with the objectives of increasing self sufficiency and Community preference while it is widely held in the Community that they have also helped support farmers' incomes through the maintenance of support prices normally well above world market prices.

The system was established some time ago when the Community was heavily import dependent and future problems associated with large exportable surpluses could hardly have been anticipated. Now there are substantial surpluses. However the same systems of support have been maintained and the levels of protection have not declined. Furthermore the Community seems almost incapable of agreeing on how best to adjust its agricultural policies to make them more compatible with this new situation. We have seen the transition from the objective of high self sufficiency to acceptance of export surpluses as virtually inevitable and therefore requiring even further measures as well as export restitutions (subsidies) to ensure that the 'inevitable' increasing surpluses can be sold on the world market.



It is often argued that with the tendency for the CAP to overrun expenditure and the tight budgetary situation in the EEC where deficits are not possible, that the best way to affect reform in that part of the world is to place it under pressure by engaging in a trade war and dumping product on world markets. However, there are two possible outcomes. Either the budget will be binding and reforms forthcoming or the budget will be expanded. There is no analysis that I have seen that permits a conclusive answer to this question - nor do I think one would be possible. It is simply a matter of informed judgment. In this latter regard it is important to realise that the 1 per cent limit is but a small fraction of the overall VAT charges. Also, a host of small savings are possible by further restricting imports into the EEC, thereby saving export restitution payments. Ultimately, it is the groups bearing the burden, the consumers and taxpayers who must tip the political balance if major change is to be expected. That is, it is inside pressure that will lead to change rather than outside pressure, with the hypothesis that significant outside pressure making matters worse being a distinct possibility. As Tangermann (1983) concluded, the CAP is essentially an inward looking policy and as such it will only change in response to internal pressure. To get this inside pressure essentially requires better research and articulation of the real costs of the domestic agricultural programs to those bearing the burdens, and evaluating alternative policies that will in a large way achieve their domestic objectives but at less cost to them and at less cost to other exporting groups such as the USA and Australia.

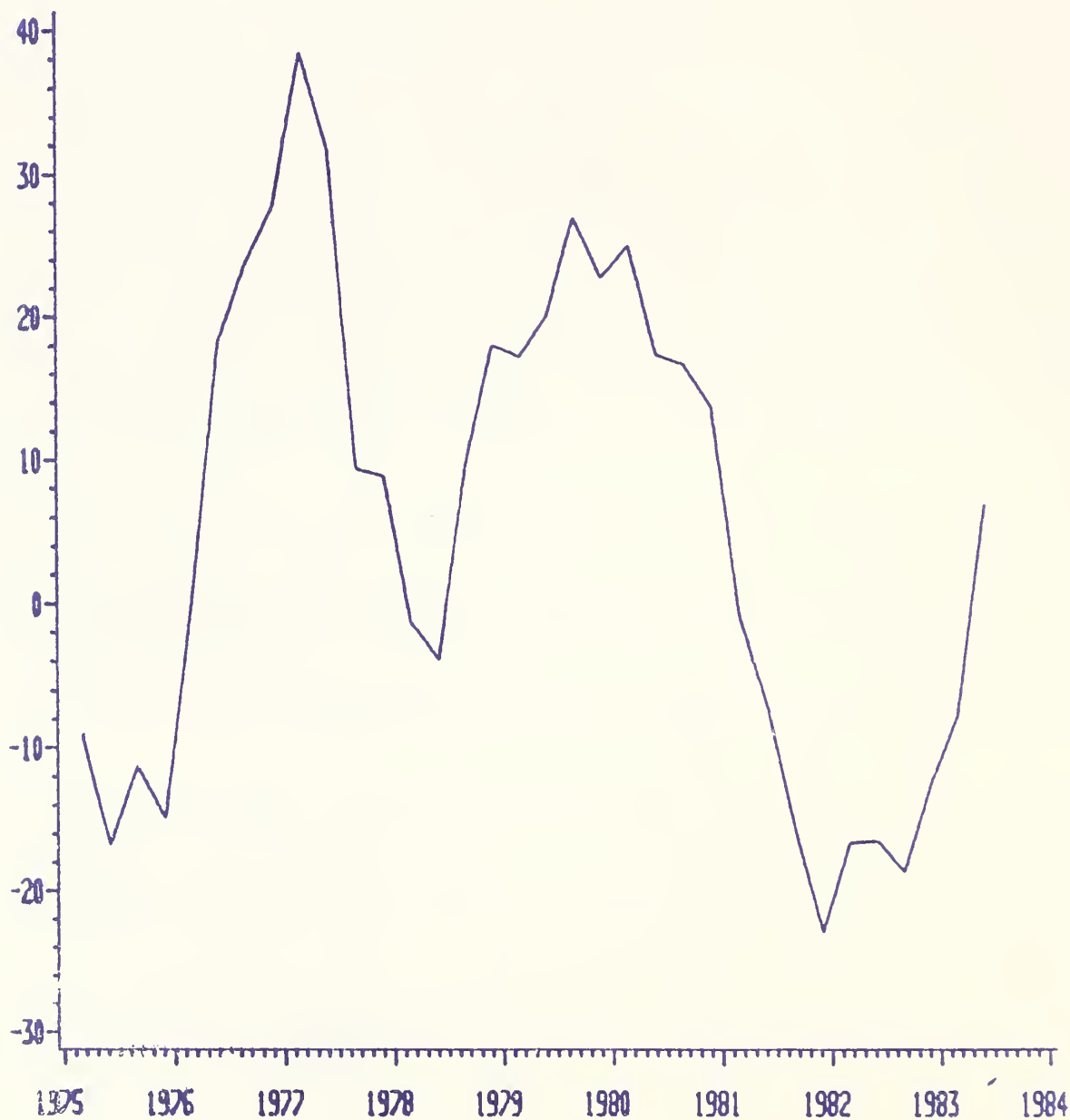
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FIGURE I

# COMMODITY PRICE:ALL ITEMS

BAR CHART



LEGEND: VARIABLE — PC4HCPAE

FIGURE II

# M1 OECD TOTAL

BAE CHART

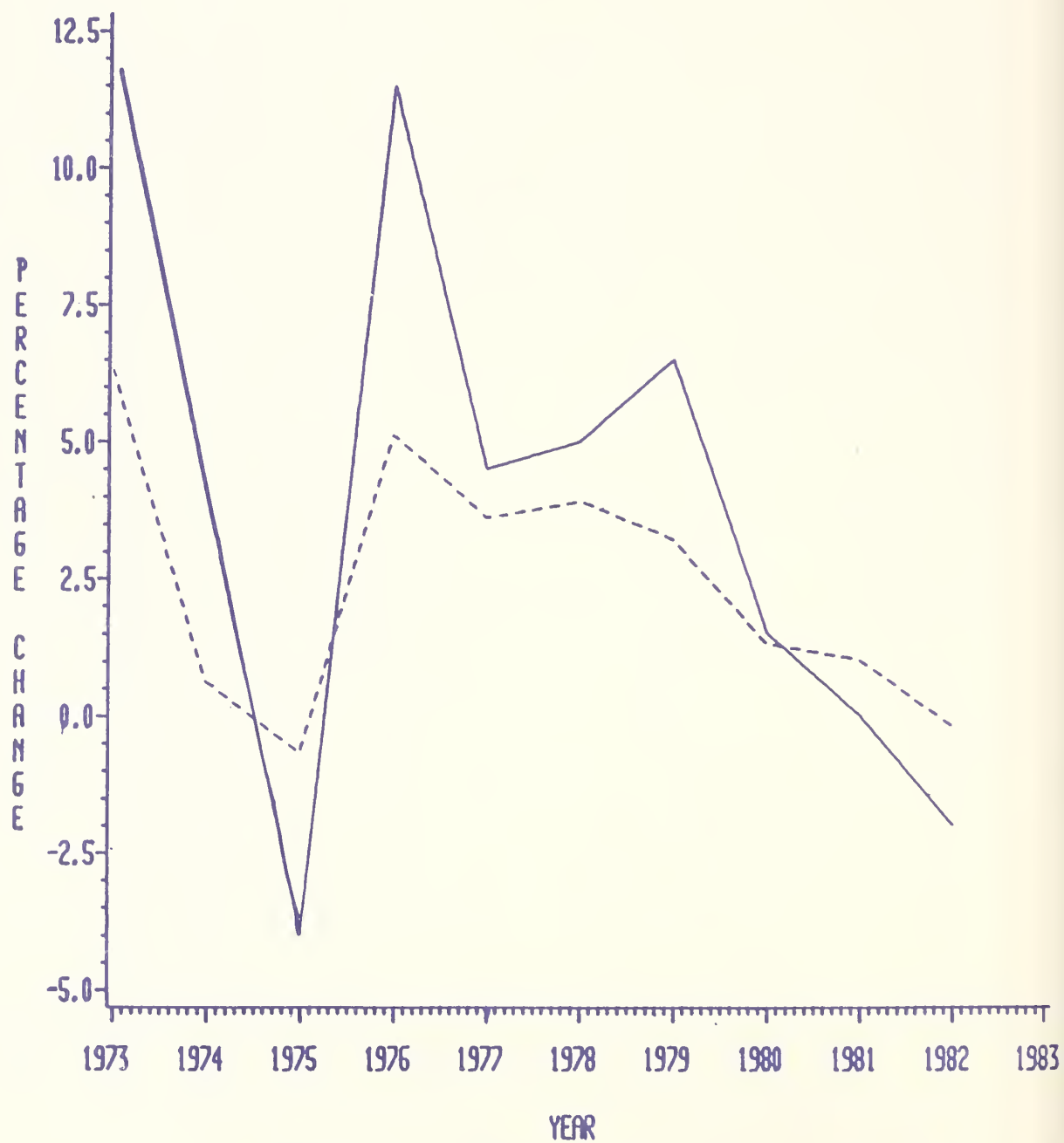


LEGEND: VARIABLE — M1OEDCP4

FIGURE III

# GROWTH IN WORLD TRADE AND WORLD GDP

BAR CHART



LEGEND: VARIABLE

— WORLD TRADE

--- INDUSTRIAL GDP



Derwent Renshaw  
Delegation of the Commission of European Communities



1984 Agricultural Outlook Conference, Session # 27  
Washington, D.C.

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I propose spending the time allotted to me this morning on the subject of the Commission's recent proposals for the adjustment of the European Communities Common Agricultural Policy, since I get the very strong impression that a number of people, not a hundred miles from this hall, hold the view that these proposals could adversely affect "the future of US agricultural trade" - the topic for this morning's session.

The framework of this package of measures was made known at the end of July since when it has been fleshed out by a number of more precise, more detailed proposals. Regrettably, there seems to me to have been a great deal of misunderstanding over these proposals - one might even say misrepresentation - to the extent that they are being portrayed as a serious threat to the US farmer and exporter.

A great deal of attention has been paid, quite understandably, to the external measures contained in the package but rarely, if at all, is any mention made of the fact that these proposed external measures form only a part, and a small part at that, of a much larger programme.

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What is more, the alleged effect of these external measures has been grossly exaggerated. As recently as last Thursday, a Senate hearing was told - in all seriousness - that the Commission's proposals regarding grain substitutes and vegetable oil would, if adopted, cost the United States 5 billion dollars in lost sales. I'm sure that no one in this knowledgeable audience would be taken in by such an extraordinary claim. But this is not the first occasion on which this figure has been mentioned so I will return and examine it in a moment.

It is, of course, not difficult to appreciate the great sensitivity here in the US as regards agricultural exports when one takes into account that 2 acres out of every 5 US farm acres rely on overseas sales - a significantly higher proportion than that for the industrial sector and that, for example, about two thirds of US wheat production is surplus to internal requirements and is consequently dependent on an unreliable world market for outlets. So, some concentration on the external effects of our proposals is perhaps not too surprising. But I should like to use this opportunity for which I am most grateful to the organisers of this conference, to briefly describe the whole package and to set the two relatively small elements concerning corn gluten feed and vegetable oil in their true perspective.

First, what are we trying to achieve? The main thrust of the Commission's proposals is

- to limit Community spending on farm support
- to adapt our agricultural policy to meet the changed conditions of the mid 80's
- to discourage surplus farm production.

The Common Agricultural Policy - more familiarly known to both its admirers and detractors as the CAP - is one of the major achievements of the Community. But, like anything else in this ever changing world, it cannot, if it is to survive, remain immutable and become fossilised. Since its inception some two decades ago, in addition to the technical progress and productivity increases acknowledged by Secretary Block on Monday, fundamental structural changes have also taken place. There are now approximately 8 million working on the land compared with 18 million 20 years ago. The number of holdings has fallen and their average size increased to about 45 acres - small by American standards, but double what it was in Europe when the CAP started.

In spite of these technical advances and of the support afforded by the CAP, and contrary to what is often believed, incomes from agriculture have increased more slowly than other incomes since 1973. High rates of inflation and divergences of inflation rates between our 10 Member States have also created problems for the CAP.

But in spite of these difficult economic conditions, the Community remains not only the worlds largest importer of food - taking about one quarter of total world agricultural imports - but also the US farmers best customer - to the extent that we currently run a massive deficit on our transatlantic agricultural

trade of between 6 and 7 billion dollars - four times the deficit we ran in 1971.

One of the principles of our agricultural policy - just as it is in most other parts of the world - is to provide a reasonable standard of living for our farmers - the descendants of men and women who have farmed our European soil for 2000 years. The CAP has, in addition to its economic role, an important social function as well. It has also got to be set against a historic, cultural and environmental framework. However, in providing our farmers with a reasonable standard of living, the Community cannot merely sign a blank cheque with no ceiling on expenditure. If Community agriculture is to succeed, the accent must be increasingly placed on production at competitive prices.

It is no secret that the background to our proposals is - first, a shortage of funds. From 1974 to 1979 expenditure on supporting agricultural markets grew at 23 % a year - almost double the rate of growth of revenue. Agricultural expenditure remained fairly stable in the period 1980 to 1982 largely because prices remained relatively high on world markets. But since then, expenditure has increased sharply - an estimated 30 % or thereabouts is expected for 1983. So, the funds are getting very low - and the Community, unlike national governments, cannot run a budget deficit.

- second, advances in technical progress and great improvements in productivity have meant that output has risen more rapidly than consumption. Increases in the volume of agricultural production have averaged between 1.5 % and 2.0 % a year whilst consumption has only risen by about 0,5 %.



This is the sombre background to the tough programme of measures proposed by the Commission - and which are now before the Council of Ministers - for the rationalisation of European agriculture.

Consequently, the Commission proposes, in particular, to tighten and to extend the application of the guarantee

threshold system to more products. Guarantee thresholds discourage surplus production by putting a strict predetermined ceiling on the amount of a given crop EC farmers may produce without being obliged to contribute towards the cost of disposing of the surplus. The Commission takes the view that it is no longer reasonable or possible to provide open ended guarantees to farmers when market outlets no longer exist. The Community's sugar producers have, incidentally, had to pay the full cost of disposing of excess sugar production for the last 2 years. But these measures will generally be strengthened and extended over a wide range.

Milk, which accounts for about one third of the EC's current farm price spending, provides a very clear example of how these new measures are designed to discourage over-production. The Commission has proposed that as from 1984 milk producers be required to pay a supplementary levy on the amount of milk they produce which exceeds 101 % of their total 1981 production. This supplementary levy would be equal to 75 % of our milk target price. In addition, the Commission has proposed a further 4 % levy on all milk produced on intensive dairy farms, together with the suspension of support buying of skimmed milk powder from October to March.

Guarantee thresholds already apply to most grains, to processed tomatoes, oilseeds and sugar and has already been proposed for dried raisins. In the case of grains and oilseeds, the system would be extended to cover all the main types of grain and major oilseeds. This will mean for these products that if production exceeds the fixed ceiling, then support prices will be abated for the next marketing year.

In addition to the tightening and extension of the threshold concept, the Commission's proposed programme also includes a restrictive price policy for all agricultural products which will take into account not only the economic situation of the agricultural industry itself but also the markets on which it depends. In the case of those products where our prices are higher than those of our principal competitors - and here let me add that in many cases they are at about the same level, (milk for example) and in some lower - the Commission proposed that the effort to narrow this gap should be accelerated. The implementation of such a restrictive price policy could well mean reductions in support prices expressed in national currencies.

A reduction in a number of production aids and premiums has also been recommended - on the processing of fruit withdrawn from the market for example and also in the olive oil and wine sectors.

These are some of the internal measures envisaged.

The full range

- production quotas with severe penalties for exceeding them
- extension of threshold guarantees
- much lower price increases for farm products (in some cases reductions in national currencies)
- prices for some surplus commodities to be fixed for more than one marketing year
- reduced intervention or support buying
- and the discontinuation of a number of aids and premiums

are all initiatives which will hit the European farmer and which will require substantial sacrifices from him. They have not been well received at home, and COPA - the European farmer's organisation - has gone as far as to say that they "would have extremely serious direct and indirect repercussions on all sectors of agricultural production and would lead to a further substantial fall in farmers' incomes, which have already declined by about 20 % in real terms since the mid 1970's."

When we are asking our own farmers to make real sacrifices and to limit their production - or as a friend of mine recently put it "when we are taking the knife to our farmers" - the Commission believes that it is not in the least unreasonable for the Community to review its treatment of competing imports provided that this is done strictly in accordance with the international trading rules as set out in the GATT.

This, of course, brings me to the two elements of the package that have been given star billing here. But before doing so I would like to turn briefly to a remark made on Monday about unfair trading practices and which referred to export subsidies. Since this clearly has some relevance for US farm exports. For me, unfair implies something that is against the rules. However, agricultural export subsidies are permitted under GATT international trading rules provided that they do not result in a member gaining an inequitable share of the market. We maintain that we have observed these rules and have thus not acted unfairly. From this I can only assume that it is perhaps the rules themselves that are considered by some to be unfair.

But back to grain substitutes and the proposed oils and fats tax.

First, grain substitutes and in particular corn gluten feed and citrus pellets. As I said earlier, we are aiming to close the gap between our grain prices and those of our competitors. This would have the effect of making substitutes less attractive. But until that time and whilst we are implementing a guarantee threshold for grains and requiring our cereal growers to limit their production, it is absolutely essential to have some effective stabilisation of the imports of grain substitutes. Since, as we all know, these products displace Community grown cereals in animal feed and have the effect of forcing more EC grain onto the world market.



Our efforts to stabilise our imports of substitutes is not a measure aimed specifically at the residues and byproducts which come from United States processing industries - yet another misconception that has gained currency. Substitutes are imported into the EC from a wide range of sources, and arrangements have already been made for manioc and bran coming from such areas as South East Asia and elsewhere.

It is now proposed to stabilise the imports of other major substitutes - corn gluten feed and citrus pellets. Imports of corn gluten feed - a residue to a large extent from the sweetener industry which has been able to take advantage of the umbrella provided by US support arrangements for sugar - have soared from 700,000 tons to 3 million tons since 1974. Citrus pellets have shown a similar rate of increase.

However, what is being proposed for both corn gluten feed and for citrus pellets is not a banning of imports, or even a reduction in imports but a stabilisation of imports and this only after fully carrying out the procedures provided for in the GATT. There will thus be no loss of trade.

The proposed tax on fats and oils is frequently presented here as a purely external measure which will impair the duty free access to the EC of soya beans, soya meal and other oilseeds and oilseed products, valued at around 4 billion dollars in 1982. This is just not so.

First, the tax would be a non-discriminatory internal consumption tax on all oils and fats (excluding butter) used in Europe for human consumption whether produced locally or imported. This non-discriminatory treatment is in full accord with international trading rules.

Second, imports of soya bean and soya meal - or any other oil seed - would not be subjected to any import tax or levy.

Third, it is extremely doubtful whether the proposed tax would have any discernable effect on the quantities of beans (or meal) imported since

a) the low rate of tax proposed combined with the reduction in butter subsidies is not likely to alter consumption patterns of soya bean oil and margarine

b) all other vegetable oils, including olive oil, whether obtained from imported or domestically produced seeds would be taxed at the same flat rate. This would have a proportionally greater effect on the lower priced oils - such as rape seed oil.

Fourth, the tax would not apply to oils used for industrial purposes, nor would it affect any oil which was later exported from the Community.

Lastly, soya beans and meal are imported very largely for animal feed and not for oil production.

This brings me back to the highly misleading figure of 5 billion dollars worth of lost markets which was being tossed around last week. I suppose that this figure represents the complete loss of all sales to the EC of corn gluten feed and

citrus pulp, currently worth about \$ 700 million and total oil-seed exports valued at around \$ 4 billion. To claim that these sales would be lost is to play fast and loose with the facts of the situation - since what is being proposed, as I have tried to explain, is a stabilisation of substitute imports - not even a cutting back and most certainly not a total ban, as is implied when a loss of 5 billion is bandied about plus a modest internal consumption tax on oils and fats which should have no discernible effect on the EC's massive imports of soya bean and meal. Neither is it very helpful in the interests of trying to understand each others problems to present our measures as was done on Monday as representing a potential loss of 3 1/2 billion \$ over 5 years on corn gluten feed and citrus pellets alone, since - I repeat - our aim is to stabilise not cut these imports.

In concluding, Mr. Chairman, I submit that this major package has not been designed to shift the burden of adjusting the CAP away from the shoulders of our own farmers onto those of American farmers and exporters. If you are in any doubt, I suggest you ask any member of the European farmers delegation now in Washington for meetings with the Chamber of Commerce who they think is being asked to bear the burden.

First, soyabean and soya bean meal exports would not be affected by the proposed tax on oils and fats.

Second, stabilisation of corn gluten feed and citrus pellet imports will be carried out in strict conformity with GATT rules and in full consultation with the United States.

Third, by far the most substantial and toughest part of this package is that which affects our own farmers and which calls for major sacrifices on their part.

These measures which represent a major shift in the direction urged for years by United States critics of the Common Agricultural Policy should be welcome news for US farmers and exporters who have long complained about the European Communities extravagant spending on agriculture. They should not reduce current levels of US exports to the Community. On the contrary, the US farmer should stand to benefit from the cutbacks envisaged in European farm production which competes with US products on world markets. This always assumes, of course, that world import demand picks up again and is maintained, that some way out of the debt problems of developing countries can be found because this is where the potential lies and that the US is able to deal with the factor that bears the most significant responsibility for the fall in its exports - the strength of the dollar.



Hidero Maki

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Economic Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries

Session 27



Mr. Chairman, Ladies and Gentlemen,

To begin with, please let me offer my heartfelt congratulations on behalf of the Ministry of Agriculture, Forestry and Fisheries of Japan on the 60th anniversary of the Agricultural Outlook Conference of the U.S. Department of Agriculture. During the past 60 years, if you recall, we experienced a number of drastic events, such as the Depression, World War II, the Korean War, and the oil crises. It was the most amazing 60 year period in history. We would like to express our respect for the officials of the U.S. Department of Agriculture and other persons concerned for their great accomplishments during this turbulent period. It is, indeed, a great honor for me to be given the opportunity to share my views with such a knowledgeable audience.

As I was introduced by the Chairman, Mr. Tracy, I am in charge of a department at the Ministry of Agriculture, Forestry and Fisheries that handles international agricultural issues. One of my most important tasks is to seek solutions to agricultural trade problems, typically represented by Japan-U.S. agricultural issues. Despite repeated consultations and earnest efforts by the officials of both our govern-

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ments, these problems still remain to be solved. I am pleased that we are here today to exchange opinions on agricultural trade freely on this memorable occasion.

First and foremost, I would like to touch on the history of Japan's own version of Agricultural Outlook. In line with the recommendation of Dr. Stine, of the U.S. Department of State, who visited Japan in 1950, we inaugurated that system in 1952, and it went into its 32nd year this year. But it has not yet developed to the same level as its U.S. equivalent and I am thinking that we should learn about the secret of its success in the United States.

Agricultural Outlook is not the only agricultural institution recommended by or introduced to us by the United States after the war. The Agricultural Land Reform, supported by the General Headquarters of the Allied Countries, not only enabled newly emerging independent farmers to better supply food to the Japanese people but also formed a stable political basis to support democracy in Japan. In addition, the Extension System and the Agricultural Statistics System which were introduced in Japan were patterned after the U.S. models, and both have made a major contribution to the development of our agriculture.

The tremendous food aid from the United States was another key element in Japan-U.S. relations immediately after the war. When the Japanese people were suffering from famine due to a war-devastated agricultural production system, food aid from the U.S. Government and Relief in Occupied Areas or GARIOA provided school lunches. Younger generations who came to develop a taste for bread and Western food through the school lunch program have since been quite dependent on imported agricultural products, mostly from the United States.

When the Japanese economy reached the stage of rapid growth in the 1960's, the peoples' life was released from the depressed condition and the dietary life changed by leaps and bounds. That is; the demand grew rapidly for meat, dairy products, fruit and vegetables. In the course of such a change of diet, Japan's agriculture was also forced to change its supply or production pattern. At the same time, Japan's agricultural imports expanded greatly, mainly wheat, feed grains and soybeans. As a result, Japan's imports of agricultural products from abroad reached \$16.3 billion in 1982, 8.4 times the \$1.9 billion amount in 1960. The largest segment of imports, worth \$6.4 billion, came from the United States, and represents about 40 percent of the total. Australia is the second with 10 percent and Canada ranks the third with seven percent. As it buys 15 percent of total U.S. agricultural exports, Japan is America's No. 1 customer. In addition to the historical relationship mentioned before, these factors attest to the closeness of agricultural trade relations between our two countries. Food items known as "American bread", "American cheese" and "American this and that" are flooding the supermarkets in Japan. A Japanese youth biting into a McDonald's hamburger with a cola in his hand has become quite a common scene on the street in any city. On the other hand, I understand that there's a boom here in the United States for tempura, sushi and Japanese food in general. I look at such phenomena with real delight as the evidence of the food and agriculture interchanges between our two countries.

To sum up, our two nations have built up firm and friendly relations in the field of agriculture. I strongly hope that these favorable relations will continue unimpaired in the future.

Having said that, however, I must confess that I strongly resent the

dark clouds that seems to be marring, in recent years, these historically good relations. It is the problem of beef and citrus trade. Since these products are only a part of our total bilateral trade relations, it is regrettable that they have been made into symbols of the economic friction between the United States and Japan and have thus developed into political issues.

The current Japan-U.S. trade friction has its root in the tremendous trade imbalance resulting from the explosive exports of Japanese goods caused by the yen-dollar exchange rate and the high U.S. interest rates. So people concerned with agriculture in Japan are quite dismayed that agricultural trade issues have been made the scapegoat.

For your further understanding, I would like to take some time to explain the present circumstances which Japanese agriculture is facing

As I said before, Japan's food consumption has been on the rise since the 1960s and the per capita calorie intake of the Japanese has now reached 2,500 calories a day. This figure is much lower than the U.S. standard of 3,400 calories a day, but for the Japanese people, who are generally smaller in stature, like myself, this is an ideal standard from both physiological and health standpoints. In addition, the current Japanese ratio of intake of the major nutriments, such as carbohydrates, protain and fat, is said to be in conformity with the guidelines set out in a report entitled "Dietary Goals for the United States." The physique of our people has improved remarkably and the Japanese now lead in terms of life expectancy. This has resulted in the ironic fact that our bosses do not retire as they get older, thus limiting opportunities for us to advance, since our so society is based on the seniority system.

Therefore, a further fast growth of total food consumption is not



expected in Japan. In particular, the per capita consumption of rice, which is a staple food for the Japanese, has been on the decline. It has, therefore, been a government policy to reduce the production of rice and to secure income for farmers by encouraging them to switch rice to forage or horticultural crops. Under such circumstances, Japan's agricultural policy will suffer a fundamental setback if imports of such agricultural products continue to increase rapidly.

As agricultural imports from abroad have sharply increased to reach the current desirable food consumption level, the rate of food self-sufficiency for Japan, a nation of 119 million people, is only 53 percent in terms of calorie intake. This means that we depend on foreign sources for about half of our food supply. Our self-sufficiency in grains is a meager 33 percent, which is the lowest level among major developed nations.

Against such a background, voices are rising in Japan in support of a secure and continuing supply of food. Our people are becoming increasingly concerned about food supply due to production fluctuations caused by abnormal weather conditions in different parts of the world in recent years.

During and immediately after the war, the Japanese people suffered from an extremely severe food shortage and many of us lived mainly on sweet potatoes and wild grass. So the Japanese share a great concern about food supply, probably beyond the imagination of most Americans who have never experienced such hardships. A case in point was the severe anxiety which the Japanese people manifested when the United States placed an embargo on soybean exports in 1973.

As you may know, Japan is a small island country, one-twenty-fifth the size of the United States and almost the same size as the state of California. Moreover, arable land accounts for only 16 percent of the

total land, on which 4.6 million farming households operate very small scale farms. The average arable land area per farming household is less than three acres.

Not only do Japanese farmers fear that Japan's farms may be crushed by the large, highly productive farms such as those in the United States if agricultural trade is thoroughly opened, but many consumers also think that it is dangerous to depend on an overseas supply of food totally or to a considerable degree from the viewpoint of food security. It is a widely held view among our people that a minimum level of food production for survival should be maintained at some expense to our own population. With this situation as the background, the Japanese Government, despite the difficult conditions of high land prices in dense islands, is placing priority in its agricultural policy on improving productivity and decreasing the cost of production by encouraging the expansion of management scale. It is for this reason that the Japanese Government for the past several years has virtually restrained its supporting prices for rice, livestock and other products. In the course of such a policy the support price gap between Japan and the United States or European countries has been narrowing steadily.

Yet, in spite of all the difficult conditions that I have dealt with, Japan has implemented a number of market-opening measures in the field of agricultural products with an aim to furthering international cooperation. The number of restricted agricultural and marine import products has drastically decreased from 80 to 22 over the past 20 years. Take soybeans, for example. Trade in soybeans was liberalized in 1961 and prior to that year you could find soybeans being grown in every farming village in Japan. But with liberalization, domestic soybeans were almost completely taken over by imports, and now soybeans rank

the second on the list of agricultural imports into Japan. Lemons were also liberalized in 1964, which wiped out our domestic lemon production. I should also point out that now more than 95 percent of our soybean and lemon imports come from the United States.

Furthermore, our government has implemented other market-opening measures, including the four packages in the last two years, in response to strong requests from abroad. Tariffs were lowered and import procedures were simplified unilaterally..

With regard to import quotas on beef and citrus, which are the focal point of the agricultural trade disputes between Japan and United States, Japan has faithfully implemented the agreements made at the GATT Tokyo Round. The Tokyo Round agreement, which is valid until 1987, set the increase of import quotas on beef and citrus until March, 1984, as well as the consultation mechanism to seek a further expansion of beef and citrus trade after 1984. We are now in the course of this consultation and it is strongly hoped that agreement can soon be reached on a mutually acceptable basis.

In addition to the important role of food production, we should not fail to note that agriculture also has social and political roles. It provides job opportunities for the inhabitants of mountainous or remote areas where jobs are scarce. The green space provided by agriculture performs an indispensable function in preserving the environment. A Japan without agriculture and farming areas is something that we could not imagine. Farming areas are also essential in maintaining political stability.

For these reasons Japan has to maintain certain protective measures for agriculture including the minimum import restrictions. But, we can see many other countries of the world also adopting

import restrictions or other protective measures. The European Community, as part of its common agricultural policy, protects its agriculture by imposing variable levies on agricultural imports. Furthermore, each member nation enforces import quota systems depending on its particular internal situation.

In the United States, refined sugar is under the import quota system and 13 other agricultural items are also under such a system even though they are exempted from GATT regulations through a waiver. Import of these items is essentially restricted for the protection of American farmers and in the case of dairy products I hear that many people in America have opposed the liberalization of dairy products by insisting that American babies grow up non-American when they are fed on foreign dairy products. The waiver is indefinite and embraces all items under the Agriculture Adjustment Act of the United States. Looking back to the time when the United States got the waiver in GATT, the Government of the United States insisted that without such an exemption in the agricultural field the government could not get the consent of the Congress to the GATT treaty. In addition, the United States has introduced a new import restriction system on beef and related meats through the Meat Import Act, whose operation might be inconsistent with GATT rules.

But I must make it clear that here I have no intention of criticizing agricultural import restrictions by the European Community and the United States. I just want to point out that each nation is in a position to take certain protective measures with regard to agricultural products based on its own domestic conditions surrounding its agriculture.

I have made some comments on Japan-U.S. agricultural relations



and the situation of agriculture in Japan. Finally, I would like to express my views about the future outlook of agricultural trade.

Since World War II, the world's agricultural output has shown a remarkable increase with the expansion of arable land and increases of yield per acre due to advancements in agricultural technology. However, with the population explosion in developing nations, famine has not yet disappeared from the surface of the earth. According to the long-term world supply-and-demand outlook for food, compiled by the Food and Agriculture Organization of the United Nations, we will be left with 260 million people on the verge of starvation even if each nation makes considerable efforts to increase food production. Long-term optimism is not warranted in viewing the world food situation. In the document "The Global 2000 Report to the President", published by the U.S. Government, it is predicted that a food shortage will occur among developing nations and the centrally planned nations and that the demand for imported foods, especially grains, by these countries will intensify greatly. A world food supply and demand estimation model developed by the Ministry of Agriculture, Forestry and Fisheries of Japan also endorses the long-term outlook for an expansion of world trade in agricultural products.

Under such circumstances in the future, the role of the United States as a main supplier will become more important and I am sure that the United States will meet its responsibility with a full understanding of its role. On the other hand, the developed importing countries like Japan should take full consideration of such long-term views.

In the case of Japan, we have grouped the commodities in the following three categories in our food and agriculture policy to secure our food supply by means of both domestic production and imports. Included in the first category are those items essentially grown in Japan, such as rice, which is historically Japan's key staple, and milk and vegetables that are perishable. Our policy regarding this category is well understood by our agricultural trading partners and it has never become a problem in Japan-U.S. trade.

The second category consists of those items which should be supplied mainly through imports, typically soybean and feed grains. This policy is supported by the assumption that there are stable and reliable supplier nations and that their international prices are relatively stable. Soybean and feed grains, because they met such criteria, were liberalized and Japan's self-sufficiency in soybeans and food grains has declined far below 5 percent. This category has never caused any controversy, either.

In the final category are those items that should be supplied through both domestic production and imports while carrying out proper adjustments. Beef and citrus are in this category. The balance between domestic production and imports is kept through the import quotas which are gradually increasing year by year. This is the very category that's being hotly debated between Japan and the United States.

With regard to agricultural products for which we must depend on imports either entirely or partially, we strongly expect the United States and other supplier nations to continue a stable supply from the standpoint of food security.

As I said before, we cannot expect as rapid an increase in either the consumption or import of agricultural products in Japan as in the past,

but imports are expected to continue to increase steadily. As you know, Japan is the most stable commercial buyer of American agricultural products and will continue to be so in the future. In view of a world food situation that does not warrant optimism and Japan's low self-sufficiency in food, it is indispensable that we secure stable agricultural imports.

This summer, the United States unfortunately was struck by a heat wave and drought. Its soybean and feed grain crop production were way down and concern was expressed over the supply of those items for the rest of 1983 through next year. In Japan, extreme views are being expressed by many people that it is dangerous to depend on the United States for such a major part of Japan's agricultural imports and that our supply sources should be diversified. But I am convinced that the United States is, and will continue to be, a reliable supplier. Under Secretary Amstutz of the U.S. Department of Agriculture stated at the Japan-U.S. agricultural consultation held in Tokyo in September this year that the United States would never again enforce an embargo. This was quite reassuring and was quite appreciated in Japan.

In conclusion, may I say that even though there is a deep trust at the base of Japan-U.S. agricultural relations, it is regrettable that Japanese agriculture is being criticized in the midst of trade friction. Most Japanese people and farmers in particular have a feeling of good will toward the United States. But the people concerned in Japan are strongly resisting the pressing demands by the United States regarding beef and citrus because they see those demands as leading to the destruction of Japan's agricultural sector. If these Japan-U.S. agricultural trade issues are left unresolved for a long time, I sincerely fear that the long-lasting friendship between our two

nations may be impaired. I certainly hope, therefore, that the American people concerned will also do their utmost to reach solutions to these problems from a more realistic standpoint in view of the existing friendly agricultural relations between Japan and the United States.

President Reagan will visit Japan next week and will confer with Prime Minister Nakasone. We Japanese will welcome the visit of your President and hope that it will become an opportunity to further strengthen the relationship of good will between our two nations. Thank you.



FUTURE FOOD IMPORTS OF THE SOVIET UNION AND  
OTHER CENTRALLY PLANNED ECONOMIES

OUTLOOK '84

D. Gale Johnson, The University of Chicago

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It is not obvious why any rational person would accept an invitation to present a paper on the prospective food imports of the Soviet Union and other Centrally Planned Economies at a time when there is so much uncertainty about the effectiveness of recent policy changes in increasing the rate of agricultural output growth in these economies. It is not only that there is uncertainty about the growth of agricultural output but there is also doubt about whether some countries will modify the consumer food price policies that have been the source of much of the political pressure that resulted in the recent high levels of food imports.

Perhaps I thought that dumb luck would hit twice. Almost a dozen years ago--in February 1972 to be exact--I gave a talk before this body with the title "Comparative Advantage and U.S. Exports and Imports of Farm Products." In that talk I said the following:<sup>1</sup>

"A somewhat surprising potential and substantial market for feed grains may be the Soviet Union and Eastern Europe. In recent months the Soviet Union has contracted for the delivery of about 5 million metric tons of feed grain by July, 1972. This is in addition to slightly larger food wheat import of about 3 million tons. The expansion in grain imports follows a record grain crop in 1970 and a crop in 1971 that was probably the second largest on record. These are not imports forced by bad crops, such as followed the crops of 1963 and 1965.

"I make no claim to understanding what is behind the recent commitment of foreign exchange for large scale feed grain imports. It seems to me there are three possible explanations: (1) Soviet estimates of grain production have been exaggerated; (2) grain stocks have been depleted to an unsatisfactorily low level and imports are being used to rebuild the stocks, or (3) the growth in demand for meat, especially beef and poultry, is outstripping the amount that can be produced from domestic feed supplies. If the latter explanation is the most nearly correct, it implies that substantial feed grain imports may occur over the next several years. If recent grain crops have been record and near record, as claimed, it is highly probable that feed grain imports two or three times the amount purchased this year will be required in one or two years out of the next five to prevent the liquidation of livestock herds, especially hogs, such as followed the poor crops of 1963 and 1965."

Subsequent statistical analysis of Soviet data on grain production and imports indicated a sharp break in the relationship between annual production and imports occurred in 1971/72. The policy decision increased grain imports

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by from 10 million to 15 million tons annually for a given level of grain output. Thus the grain imports of approximately 8 million tons in 1971/72 resulted from the policy change and was not due to a grain production shortfall in 1971. As noted, 1971 grain output was at near record levels.

In the five years from 1972/73 through 1976/77 there were two years when grain imports were from two to three times the 8 million tons of 1971/72--23 million tons in 1972/73 and 26 million tons in 1975/76.<sup>2</sup> I should hasten to add that net grain imports during 1971/72 were quite modest. In the two years of large grain imports the USSR simply cut off its traditional customers in Eastern Europe. A similar pattern has persisted until this day.

I have no particular reason to believe that I will come as close to what will occur in the next few years as I did on that day in February 1972. There are many reasons why a particular set of trade projections will be wide of the mark. But before looking to the future, a few words about the recent past are in order. Let us now consider developments in world trade in agricultural products during the 1970s and the role of the Centrally Planned Economies in those changes.

During the 1970s it could be said that the Centrally Planned Economies dominated the growth in world cereal imports. These economies accounted for nearly 50 percent of the decade's growth and by the end of the decade for approximately a third of world grain imports (see Table 1). At the beginning of the decade the CPEs were almost in balance in their grain trade, with net annual imports of just 5 million tons for 1969-71.

The change in the agricultural trade balance was equally striking. In 1970 the CPEs had a negative agricultural trade balance of just \$2.3 billion; in 1981 the negative balance was \$27.1 billion (see Table 2). In 1981\$ the 1970 negative trade would have been about \$6.5 billion. Thus the increase in the negative trade balance was due primarily to no growth in the quantity of agricultural exports and a more than doubling of the quantity of imports.

The emphasis that has been given to the USSR-US grain agreement and to USSR grain imports in general may lead to the impression that Soviet imports of agricultural products consist primarily of grain. In recent years this has not been the case. The sharp increase in the value of USSR agricultural imports during the 1970s--from a value of about \$2.5 billion in 1970 to almost \$10 billion by the middle of the decade and to \$21 billion in 1981--represented a wide spectrum of agricultural products. While grain and grain products accounted for 41 percent of the value of agricultural imports in 1981, sugar accounted for 19 percent, meat and dairy products for 9 percent and fats and oils for 6 percent. In 1981 the USSR imported a larger quantity of meat than did the United States and in recent years has displaced the United States as the world's largest importer of meat and meat products.<sup>3</sup> The increase in imports of sugar, with no significant offsetting exports in recent years, also has put the USSR in first place as the world's largest sugar importer, with imports of 4.2 million metric tons in 1981 and 6.2 million in 1982. U.S. imports of sugar have been declining, contrary to the application of the principle of comparative advantage, and now are only a little more than half the USSR import level. Perhaps in this case Soviet decisions are guided by the notion of efficient use of its resources to a greater degree than are ours, though I suspect that the sharp reduction in sugar beet output that has occurred since 1978 was neither intended nor desired.

TABLE 1.—International Trade in Cereals by Economic Groups, 1960-62, 1969-71, 1977-79 and 1980-81 (million metric tons)

Country Group	1960-62			1969-71			1977-79			1980-81		
	Export	Import	Net	Export	Import	Net	Export	Import	Net	Export	Import	Net
Industrial Countries	53.8	37.1	16.7	77.6	52.1	25.5	148.4	63.1	85.3	195.0	73.5	121.5
United States	31.4	0.6	30.8	36.3	0.4	35.9	90.9	0.2	90.7	113.2	0.2	113.0
Canada	10.2	0.7	9.5	13.7	0.5	13.2	18.5	0.7	17.8	22.2	1.4	20.8
Australia	5.9	--	5.9	8.8	--	8.8	11.7	--	11.7	16.4	0.1	16.3
France	3.4	1.0	2.4	11.4	1.0	10.4	14.3	1.9	12.4	20.9	1.7	19.2
Japan	0.1	5.0	-4.9	0.7	14.7	-14.0	0.3	23.3	-23.0	0.9	24.4	-23.5
Centrally Planned	9.8	12.4	-2.6	12.4	17.5	-5.2	9.3	50.0	-40.7	7.6	73.3	-65.7
USSR	7.6	0.6	7.0	8.2	2.7	5.5	3.7	20.7	-17.0	2.5	37.5	-35.0
Eastern Europe	1.3	8.3	-7.0	2.2	9.7	-7.5	4.1	16.6	-12.5	3.6	16.2	-12.6
China	0.9	3.5	-2.6	2.0	5.2	-3.2	1.5	12.7	-11.2	1.2	17.5	-16.3
Low Income Countries	2.4	7.3	-4.9	2.1	10.9	-8.8	2.8	11.7	-8.9	3.3	13.1	-9.8
India	--	4.1	-4.1	--	3.6	-3.6	0.8	0.6	0.2	0.8	1.0	-0.2
Indonesia	--	1.2	-1.2	0.2	1.3	-1.1	--	2.8	-2.8	--	2.8	-2.8
Middle Income Countries	9.6	10.9	-1.3	17.6	24.2	-6.6	26.1	49.2	-23.1	20.2	55.8	-35.6
Korea	--	0.5	-0.5	--	2.6	-2.6	--	4.1	-4.1	--	6.4	-6.4
Argentina	5.6	--	5.6	3.5	0.1	3.4	14.6	--	14.6	14.1	--	14.1
Brazil	0.1	2.1	-2.0	1.2	2.1	0.9	0.7	4.8	-4.1	--	6.2	-6.2
Mexico	0.2	0.1	+0.1	0.5	0.4	0.1	0.1	4.0	-3.9	--	6.8	-6.8
South Africa	1.3	0.2	1.1	0.3	1.2	0.9	2.6	0.2	2.4	4.2	0.3	3.9
Thailand	1.9	--	1.9	2.9	0.1	2.8	4.4	0.1	4.3	5.5	0.2	5.3
Capital Surplus Oil												
Exporters	--	0.7	-0.7	0.1	2.0	-1.9	0.1	6.8	-6.7	2.3	10.4	-8.1
Total	75.6	68.4	--	109.8	103.9	--	186.9	183.3	--	228.4	226.0	--

Source: FAO, FAO Trade Yearbook, various issues.

TABLE 2

NET BALANCE IN AGRICULTURAL TRADE FOR CENTRALLY PLANNED ECONOMIES, 1969-1981  
(Millions of U.S. dollars)

Year	U.S.S.R.	China	Eastern Europe	G.D.R.	Hungary	Poland	Yugoslavia
1969	- 325	--	--	- 505	195	- 173	- 9
1970	- 1,046	380	--	- 704	156	- 149	- 20
1971	- 793	625	--	- 665	188	- 283	-142
1972	- 1,972	645	--	- 780	353	- 111	- 95
1973	- 3,223	425	--	- 873	548	- 267	-275
1974	- 2,588	240	--	-1,314	442	- 556	-735
1975	- 6,710	1,500	--	-1,308	588	- 663	-287
1976	- 7,252	1,720	-2,819	-1,509	516	- 917	-285
1977	- 6,399	730	-2,713	-1,548	594	-1,016	-537
1978	- 7,905	636	-2,833	-1,610	615	-1,214	-354
1979	-10,527	173	-3,893	-1,757	891	-1,350	-704
1980	-14,089	-1,081	-4,389	-1,927	889	-2,084	-635
1981	-17,408	- 219	-4,059	-1,618	1,211	-2,452	-274
1982	-18,000 <sup>a</sup>	500					

Sources: FAO, fao trade yearbook, various issues and U.S. Department of Agriculture, Economic Research Service, World Agriculture: Outlook and Situation, WAS-31, Supplements 1, 3 and 5.



However, the early 1980s have seen a slowdown in the growth of agricultural imports by the CPEs. In 1982 the value of agricultural imports of the CPEs was less than in 1981; this was the first year since 1969 in which there was a decline in the value of their agricultural imports. Does the recent decline, which has continued into 1983, portend a continuing fall in the value of agricultural imports by the CPEs? The impact of the CPEs on world agricultural trade depends, also, on the prospect for their export growth. As noted above, there has been little or no growth of CPE agricultural exports, as measured by volume, since 1969-71. Is this pattern likely to remain during the 1980s? It is to these two questions that I shall devote my remarks. In doing so, I will discuss the USSR, Eastern Europe and China separately and then try to aggregate.

## USSR

In my opinion, the greatest uncertainty among the CPEs about prospective agricultural trade developments exists for the USSR. In 1981 the USSR was the world's second largest importer of agricultural products; only West Germany imported more and then by only some 5 percent. Given its enormous agricultural resources, its agricultural exports were almost miniscule by comparison at a little less than \$3 billion; this was less than Spain's value of agricultural exports. If net trade is considered, the USSR is by a wide margin the world's largest importer of agricultural products.

Soviet agricultural imports will continue to be a function of its food price policy and its capacity to once again achieve a significant rate of growth of its agricultural output. If its present policy of highly subsidized prices for meat, milk, wheat products and potatoes is maintained, there will continue to be a substantial unsatisfied demand for meat and milk products. This unsatisfied demand will in the future, as in the past, put pressure upon the government to more nearly meet that demand at fixed nominal prices by maintaining a high level of imports unless domestic production can be increased significantly.

In Prospects for Soviet Agriculture in the 1980s I projected that Soviet grain imports would have an annual level of from 25 million to 40 million tons during the 1980s.<sup>4</sup> This still seems to me to be a reasonable estimate. Even this projection assumes that grain production for the rest of the decade will be substantially higher than in recent years, perhaps 220 million to 225 million average for the last half of the decade. This is below the 1978 record output of 237 million tons but is a fourth higher than the annual average of 177 million tons for 1979-82. This projection assumes that adverse climatic conditions have not been the major factor in the recent low level of grain and other crop production. The projection also assumes that there have been no recent policy changes that are likely to have a major impact upon the output performance of Soviet agriculture.

I see nothing in the new Food Program announced with such fanfare in May 1982 that will have a positive impact upon the productivity of Soviet agriculture during the 1980s. The Food Program is but a continuation of past programs and policies and makes no fundamental changes that give hope for improvement in agricultural performance. In spite of rhetoric implying that farms were now to be given greater independence and initiative, the Food Program appears to have merely added several new administrative layers, starting with the Regional Agricultural Production Organization and with similar coordinating units at the republican and national levels. True, prices paid to farms were increased and the

method of paying bonuses for deliveries in excess of required levels were changed to minimize favoritism and corruption. But it is highly probable that in most cases the increased procurement prices were merely sufficient to cover cost increases that had already been incurred since the last changes in the procurement prices. The fact that the program provided for forgiving nearly 10 billion rubles of bad farm debts and rescheduling more than 11 billion rubles of farm debt is consistent with the view that for many farms recent procurement prices have been inadequate to cover production costs.

The emphasis in the food program of giving greater local initiative to the individual farms needs to be put in context. In his major speech in May 1982 when the new food program was announced Brezhnev said: "It is necessary to get rid of administrative fiat and petty tutelage with respect to collective farms and state farms. . . . No one should be permitted to demand that farms fulfill any assignments not envisaged by the state plan or ask them for any information except as established by state reporting requirements." But these good words had no effect upon the formulation of the new food program. Nor was this the first time Brezhnev had used almost the same words: "We must put an end to the practice of command and administration by fiat, to petty tutelage, to the usurping of the functions of the leaders and the specialists of the collective and state farms, must eradicate any manifestations of ostentation and ballyhoo." When did he say this? In 1965. Brezhnev went to his grave next to Stalin without having forced the agricultural bureaucracy created by Stalin to relinquish its stranglehold over the details of farm operations.

But 1965 was not the first time that an effort was made to loosen the dead hand of the bureaucracy. Khrushchev also tried. In 1955 a decree was issued that gave the managers of collective and state farms significant authority to make their own decisions and to have some influence over their procurement obligations. But apparently nothing happened because another decree was issued in 1964 in which the 1955 decree was emphasized and punishment was threatened for those officials who infringed upon the authority of the management of collective and state farms. This brief summary of a quarter century of effort to reduce the role of the bureaucracy and to minimize interference with the operations of collective and state farms is presented to indicate that one must take a skeptical attitude in evaluating efforts to give greater independence to the farms in running their own affairs.

Nor have any policy changes introduced by Andropov changed the above assessment. The introduction of the contract system for rewarding farm workers appears to be nothing more than a warmed over version of the *zveno*, an idea whose time has not come in over a quarter century of experimentation and occasional attention but an idea that the bureaucracy has always been able to suppress. Press reports of a conference held in Belgorod March 18-19, 1983 support the view that relatively little progress had been made in implementing the contract system under which a small group of workers would be assigned land and machinery and provided with the necessary inputs and who would have their incomes directly related to their output performance.<sup>5</sup>

As of 1983 the cost of food price subsidies is about 51 billion rubles, with the Food Program accounting for 16 billion rubles.<sup>6</sup> A reduction in these enormous costs can only come about in the short run through sharp increases in the retail prices of meat and milk products as well as for bread and flour and potatoes. Obviously there has been a reluctance to increase these prices or there would not



now be a food price subsidy bill that is now significantly greater than the retail value of the subsidized products. The disequilibrium between demand and supply at the current retail prices for meat and milk products is now so great that an increase in retail prices of as much as 50 percent would be inadequate to bring about a balance in the market. And the required price increases grow year by year as nominal retail prices are kept constant in the face of rising money wages. Consequently I do not expect that any change in food price policy during this decade will have a significant effect on Soviet agricultural imports.

Nor do I believe that other than modest output improvement will occur over the next few years. Consequently I expect that the total value of USSR agricultural imports will remain at something near their recent high level of about \$20 billion. They could decline to perhaps \$15 billion if grain and other crop production respond to favorable climatic conditions and could increase to perhaps \$25 billion as a result of relatively low levels of Soviet output and above trend levels of international market prices for grains, meats, fats and oils and sugar.

Except for cotton the USSR is unlikely to be a major factor in world exports of agricultural products. In 1980 approximately half of its \$2.7 billion value of agricultural exports was accounted for by cotton. In times past the Soviet Union was an important factor in the export of sunflowers but such a possibility hardly exists for the current decade. Thus while I believe that the Soviet Union will continue to be a large importer of agricultural products--perhaps the largest in the world--I do not see a significant probability that agricultural imports will increase during the 1980s.

#### Eastern Europe

It is now rather clear that a significant part of the growth of agricultural imports in Eastern Europe during the 1970s was not a sustainable growth. It was a growth made possible by the easy availability of credit. Part of this was either guaranteed by various governments or was loaned directly by governmental agencies. I have estimated that perhaps as much as a third of the increase in the Polish hard currency debt during the 1970s of more than \$20 billion was the result of borrowing to buy grain and other feeds.<sup>7</sup>

A significant factor in the sharp increase in agricultural imports was the policy of subsidized retail prices for meat and milk as well as other foods. The governments attempted to equate supply and demand for meat products at artificially low prices. And until the end of the decade, they were remarkably successful in doing so. Between 1971 and 1979 per capita meat consumption in Eastern Europe increased by almost 25 percent--from 54 to 67 kilograms. But this increase was made possible to some considerable degree by increased imports of feeding materials that were partially financed by borrowing money.

While memories are short, they are not likely to be so short that the 1980s will see substantial net new credit made available to buy feed materials or other agricultural products. In the face of the financial difficulties facing the region and with the significant increases in retail prices that have occurred in some of the countries, especially Poland, Romania and Hungary, total agricultural imports have actually declined after reaching a peak in nominal dollars in 1980 at \$12.7 billion. Further declines seem probable, perhaps about a quarter below the 1980 level in real terms. More rationality in retail pricing of food plus

some improvement in farm production in Poland should lead to a gradual decline in agricultural imports during the decade, reaching the approximate level of some quarter below that of 1980.

## China

China appears to have recovered its status as a net agricultural exporter, a status that it briefly lost in the realignment of its agricultural policies in 1979. This realignment, including increases in farm prices and a reduction in the level of grain procurement, was associated with a sharp increase in grain imports at the same time that cotton and soybean imports were substantial. The increase in grain imports, in my opinion, was an important component of the liberalization of agricultural policies that started in 1979 and have now reached almost revolutionary status. The increase in grain imports, which now provide for at least 40 percent of the total grain consumed in urban areas, made it possible for policy makers to accept greater risks in agricultural reform and to provide for more adequate incentives for rural people, especially in the poorest rural areas.

From 1957 to 1977 there was no increase in per capita grain production in China. The per capita real incomes of the rural people hardly increased at all and, according to statements by Chinese officials, at least a tenth of the Chinese population or 100,000,000 people did not have enough to eat much of the time. Since 1977 and the fall of the Gang of Four there have been revolutionary changes in farm policy. The introduction on a nearly universal scale of some form of responsibility system has resulted in the near abolition of the commune and greatly reduced the power of the production teams and brigades over the lives of the ordinary farmer. The responsibility system, while involving schemes that vary in details, makes it possible to have a rather direct link between productivity and income. This link had been nearly destroyed by the methods used to relate labor input to income under the rigid application of Maoist doctrine. While only a few years ago egalitarianism was the guiding principle for distribution of income, today "getting rich with honesty" is upheld as socially desirable.

The effects of the many changes made in 1979 and later upon agricultural output have clearly been positive, though at the moment it is not possible to determine how much of the sharp increase in agricultural output achieved since 1980 should be attributed to climatic factors and now much to policy changes, including the much greater rewards associated with working hard and well.<sup>8</sup> But so far the increased output has had only a modest negative impact upon imports of food products because farm incomes have increased at a significant rate and, presumably, the amount of food consumed by such families.

Cotton and soybean imports are likely to remain at modest levels if not to disappear. Under Mao the emphasis upon regional grain self sufficiency adversely affected cotton and soybean production. Now that farms are less restrained in what they can produce, though not all restraints have been removed, cotton and soybean areas and outputs have risen and imports have been largely eliminated. Of course, if there were more liberal trade in cotton textiles in the world, China might well once again import significant amounts of cotton.

Based on little more than hunches, I expect that the People's Republic of China grain imports will increase at modest rate, perhaps reaching an annual level of 20 million tons by the end of the decade. I believe the reforms of



agricultural policies will be successful enough to prevent any significant level of cotton or soybean imports. As meat production grows in response to rising real incomes, some pressure may be put upon grain and protein feed supplies by the end of the decade. However, livestock now consume a rather small percentage of total grain output--perhaps about a sixth<sup>9</sup>--so that even an increase in grain used as livestock feed of 50 percent would require only modest increases in imports if grain production increases at an annual rate of 2.5 percent for the decade. Some of the protein feed required could be obtained by reducing the amount of oilmeals used as fertilizer. The above assumes that population growth is limited to no more than 1.5 percent annually and it does appear that such may be the case.

### Summary

During the 1970s the Centrally Planned Economies were a major source of the growth in world imports of farm products. This was particularly true for the grains; but it is worth noting that the value of all food imports by the Centrally Planned Economies increased at almost twice the rate for the world as a whole between 1969-71 and 1981. But there is little prospect that these economies will be a dynamic factor in world import demand for agricultural products during the 1980s.

In fact, it is probable that the grain imports of these economies will be at a lower level in 1990 than in 1980, perhaps by as much as a fifth. Both the USSR and Eastern Europe are likely to have reduced levels of grain imports; the small increase that might occur in China will be inadequate to offset the other declines. For 1980-81 the grain imports of the CPEs averaged 73 million tons; by 1990 annual imports might fall in the range of 60 to 70 million tons. Recent projections made in the Economic Research Service puts the grain imports of the CPEs at an even lower level for 1991/92, namely at 53 million tons.<sup>10</sup> This seems to me to be on the pessimistic side, though I would not rule it out as being impossible.

For agricultural imports as a whole the outlook seems to me to be somewhat less pessimistic. After adjusting for price level changes it is likely that the value of CPE agricultural imports will fall during the decade but by rather less than the decline in grain imports. This conclusion assumes that neither the USSR nor China will modify their food price policies and that food consumption will continue to be subsidized. This is much more important an assumption for the USSR than for China since in China it is primarily the grains and vegetable oils that are subsidized for urban consumers. The grains are rationed and presumably rationing could be reimposed on vegetable oils. It is primarily in the USSR where a radical change in food price policy could have a significant impact upon the level of food imports. But since in the formulation of the Food Program there was no increase proposed for food prices and, instead, the cost of food subsidies were increased by more than 40 percent, it appears that Soviet food imports will continue to be encouraged by food prices that for meat and milk cover but a fraction of the total costs of bringing those products to market.

The other factor that could result in a sharp decline in agricultural imports by the CPEs would be a sharp improvement in the output performance of Soviet agriculture. It is difficult to imagine how a country that is endowed with the enormous agricultural resources possessed by the Soviet Union could manage to be the

world's largest net importer of agricultural products. But it has. The problems facing that agriculture are so acute, in terms of inappropriate policies, misdirection from planners and bureaucrats at all levels, incentives that are exceedingly weak, poor performance of the input supply and marketing sectors, and the long and serious neglect of the rural infrastructure, that it is unlikely that even a drastic reform of agricultural prices, policies and incentive structures could have much effect upon output within the present decade.

The Centrally Planned Economies contributed not at all to the growth of world agricultural exports during the 1970s. I can see no basis for assuming that there will be a significant growth in such exports during the 1980s. There is a long run potential for growth in agricultural exports but realization of that potential for Eastern Europe and the USSR require radical policy changes that I do not foresee occurring soon enough, if at all, to affect agricultural production and consumption during the 1980s.

## FOOTNOTES

1. Presented at the 50th National Agricultural Outlook Conference, Washington, D.C., February 23, 1972. Office of Agricultural Economics Research, University of Chicago, Paper No. 72:1, February 15, 1972, pp. 6-7.
2. Most of the data referred to in this paper come from the annual supplements to United States Department of Agriculture, Economic Research Service, World Agriculture: outlook & Situation for Eastern Europe, USSR and China. These supplements are invaluable to any one interested in agricultural developments in the Centrally Planned Economies.
3. Food and Agriculture Organization of the United Nations, fao trade yearbook, Vol. 35, 1981. The quantities of meat imported in SITC numbers 011, 012 and 014 were included. The value of U.S. imports of meat was larger than for the USSR.
4. D. Gale Johnson and Karen McConnell Brooks, Prospects for Soviet Agriculture in the 1980s (Bloomington: Indiana University Press, 1983), pp. 100-06.
5. Report of Speech by Politburo member M. S. Gorbachev in Sovetskaya Rossia, April 22, 1983.
6. Prospects for Soviet Agriculture in the 1980s, pp. 93 and 109.
7. For a discussion of some of the factors that resulted in the significant increase in the external debt of Poland and other Eastern European countries see my paper "Food and Agriculture of the Centrally Planned Economies: Implications for the World Food System," in Essays in Contemporary Economic Problems: Demand, Productivity, and Population (Washington, D.C.: The American Enterprise Institute, 1981), pp. 171-213. In this article I discuss the major developments that increased the dependence of the Centrally Planned Economies upon the rest of the world for their food supplies.
8. The official Chinese index of gross agricultural output in 1982 was 30.8 percent greater than in 1978. This amounts to an annual growth rate of 6.9 percent. The Chinese index includes the output of fisheries and forestry as well as what they define as rural sideline production which is largely, though not exclusively, the processing of agricultural products. See USDA, ERS, China: World Agriculture Regional Supplement: Review of 1982 and Outlook for 1983, Supplement 6 to WAS-31, p. 2.
9. Ibid., pp. 18-20. It is estimated that in 1980 49 million tons of grain were fed to livestock. In that year grain production, which includes tubers (potatoes), pulses and soybeans was 320 million tons. The same source projects grain fed to livestock in 1990 at 77 million tons. Grain production, as we define it, was about 300 million tons in 1980; thus grain fed to livestock was 16 percent of total grain produced. The same source projects grain fed to livestock in 1990 at 77 million tons. If grain production increases at an annual rate of 3 percent, 1990 production would be a little more than 400 million tons; the amount projected for feed use would be 19 percent of the total.
10. U.S. Department of Agriculture, Economic Research Service, World Agriculture: Outlook & Situation, WAS-30, December 1982, p. 14.

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We are discussing the future of U.S. agricultural trade. I would like to approach it from a global perspective which puts some of the pieces together and looks at the two main aspects -- the future growth in demand and the prospects of competitive supplies.

To put the world demand problem in perspective we should remember where demand growth took place in the 1970s and then appraise the situation in those areas in 1984 and several years beyond.

The growth in world import demand came from two sources during that rapid growth period. One was the movement of the centrally planned economies from a position of no net imports to that of net importers of 50 million tons of grains and significant quantities of soybeans, meat, and dairy products.

The second great area of growth in import demand was the middle income developing countries. As a group they increased their net imports of grains by some 40 million tons over the decade. Near the end of the decade this expansion was also fueled by new demand from the OPEC countries whose explosive income growth created large increases in the demand for more high quality foods.

All of this was so encouraging that little notice was taken of the fact that the growth in the traditional industrial country markets, Western Europe and Japan, was slackening or, in the case of Europe, reversing.

We have heard earlier on this program a view of the prospects for two of these groups of countries. Let me try to pull together an overview that ties them together into a world market picture.

#### The Centrally Planned Economies

We have heard the view that Soviet agriculture suffers as much from a problem of organization, incentives, and over-centralized management as from weather. This is a view I share, and thus I suspect that over a period of years agricultural performance in the centrally planned economies will continue to disappoint their leadership. It does not follow, however, that their imports will rise continuously to offset poor agricultural performance.

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The increase in net imports of grains by the centrally planned economies was a major factor in the expansion of world grain trade in the 1970s. Over the decade their net imports of wheat grew by 30 million tons and of feed grains 25 million tons. They thus were the single largest factor in the expansion of world wheat trade and a major factor in world coarse grain trade. At their peak the Soviet Union alone accounted for 23 percent of world wheat imports and 26 percent of feed grain imports.

Now, however, apart from China, world economic conditions have combined to create serious economic problems for the centrally planned economies and, consequently, their ability to import has been seriously undermined. In several of these economies the population is undergoing a real reduction in living standards insofar as food is concerned, and this reduction shows in the USDA's estimate of feed grain 1983/84 imports by Eastern European countries, which are down substantially from 1980/81.

While current economic news is dominated by the debt and balance of payment problems of Latin America, we should remember that it was Eastern Europe where these problems first surfaced in 1980 and 1981. As yet there is no indication that these countries have found solutions to their basic economic problems. It seems unlikely that those countries will resume the path of higher and higher grain and oilseed imports. Markedly higher export earnings seem unlikely and no one seems interested in providing increased credit, which was a significant source of finance for imports during the 1970s.

Even the Soviet Union does not appear immune from prospective balance of payments problems. Its export earnings are increasingly dependent upon petroleum and natural gas and the changed outlook for energy prices suggests that the USSR will not have steadily rising export earnings. Thus, the economics of the situation suggests that Soviet imports of foodstuffs will be constrained both in 1983/84 and for the foreseeable future. This is one of the several reasons I would not expect the Soviet Union to try to expand its livestock output by use of an expanded grain import program as they did in the 1970s.

It also appears that the situation goes beyond economics. Whereas in our private exporting economy our exporters will sell to any country where sales are not prohibited by law, there is a close tie between foreign policy and import policy in centrally planned economies. It is no secret that U.S.-Soviet relations are not especially warm, and in varying degrees this is true of relations with other East European centrally planned economies. Thus, I would expect that their import sources will remain diversified both next year and for the foreseeable future.

Thus, for 1983/84 there is clear expectation that the centrally planned economies will import substantially less than during

their peak import years of the late 1970s, and that this lower level of imports will continue for years to come, excepting year-to-year weather induced changes. If this is the case, then one of the major sources of growth in world grain trade in the past decade will have disappeared for some period.

### The Middle Income Developing Countries

The second source of growth in world agricultural trade was in the imports of middle income developing countries, whose net imports of wheat and feed grains also increased dramatically during the 1970s. The countries involved included Brazil, Mexico, Nigeria, Korea, the OPEC countries, and the Philippines, among others.

All of these countries had something in common then and do now. During the 1960s and 1970s they all experienced large and sustained increases in per capita incomes which enabled people to eat better -- better being more meat and poultry and eggs and other higher quality foods.

What they have in common now is that all of them are buried in an avalanche of foreign debt upon which even the interest cannot be paid and on which the principal payments will be postponed indefinitely. This has brought some 46 countries under the IMF equivalent of Chapter 11 and, despite all pressures by the IMF on commercial banks to continue lending, has resulted in a large decline in net credit flows to them. This in turn has led to serious economic declines and to a common prescription for each to import less and export more.

We have already seen a substantial decline in agricultural imports by a number of the affected countries, but thus far this decline has been masked in part by a massive infusion of short-term Commodity Credit Corporation (CCC) export credit which cannot possibly be repaid on schedule.

Whereas we have seen most of the depressing effect of the balance of payments and credit squeeze insofar as Eastern Europe is concerned, this is not likely to be the case as far as the middle income developing countries are concerned. If for reasons of budget tightness, financial prudence, or otherwise, the CCC credit to these countries were to diminish, we would then see the full effect of this foreign financial crisis on world agricultural demand. In my view, it would be substantial and could last for some time.

The reason for this pessimistic view is the unfortunate choice facing the numerous countries in this situation. On the one hand, if they attempt to work out of their debt problem they face a long period of internal austerity, little or no economic growth, and a

real decline in income after two decades of uninterrupted growth. On the other hand, they might consider defaulting on their debts, which would create international financial chaos and almost certainly end the flow of new external credit and capital for some period. From the point of view of political policy makers in the affected countries, the choices are horrible. From the point of view of one interested in expanded world agricultural trade, the outcomes also are bleak because either outcome suggests it will be some time before a normal pattern of economic growth and trade may be restored in those crucial economies.

Thus, as we look at the world demand situation for 1983/84 and some years ahead, we find that the two parts of the world which accounted for almost all of the growth in world grain and oilseed exports during the last decade will have limited growth and sharply curtailed capacity to pay for imports. We have had slowdowns in economic activity before, accompanied by some slowdown in trade. We have not had, in recent history, a decline in growth compounded by debt and balance of payment crises. We have no basis to judge either the depth or duration of the problem, but it seems likely that its impact and duration will far exceed the typical business cycle and may well dampen the recovery in the developed economies.

#### Increasing Competition For Export Markets

Over the last three years the United States has become the residual supplier in the world markets for our key agricultural exports. We have been losing market share in a static or declining market which has been shrunk by recession, debt, and balance of payments problems. There are several reasons for this, and the impact has been different in different markets.

A major reason for our loss of market position has been the strength of the dollar against other major currencies. After a long and steady decline in the value of the dollar from 1973 to mid-1980, the dollar started to strengthen and has continued to do so through 1983. This has the effect of making our products more expensive to foreign buyers, and it makes it possible for our competitors to undersell us without cutting prices to their own producers in their own currencies. The effects of the stronger dollar can clearly be seen by comparing the situation in August 1980 and in the second week of August 1983. In those two periods the farm price of wheat in the U.S. was \$3.34 and \$3.33 per bushel, respectively. However, because of exchange rate changes the price in German Marks was DM 5.97 and DM 9.11. In French Francs the 1980 price was FF 13.0, and the 1983 price was FF 27.4. In Japanese Yen the comparable figures are 749.6 and 821.5, respectively. Thus, even though our producers were getting the same price in the two years, our foreign buyers were paying substantially more. It is not surprising that they are buying elsewhere when they can and holding their purchases to a minimum.



The other effect of the strong dollar is the protection and encouragement it gives to our competitors. Let us look at these same figures in that context. In August 1980 our wheat price translated into \$2.89 Australian; in August 1983 our wheat price translated into \$3.82 Australian. In other words, the change in the exchange rates will allow the Australian farmer to receive almost \$1.00 a bushel more for his wheat while our producers get the same. Or conversely, Australian wheat can undersell ours in the world market by a little bit and still have it return more than it did three years ago. It is not surprising to learn that Australia is likely to produce and export the largest quantity of wheat ever!

There are several reasons for the strength of the dollar. One is that capital is flowing from other countries to the United States because it appears safer here. This is a common occurrence during times of financial and political instability. However, the major reason for the strength of the dollar is the large capital flows brought on by the immense Federal deficit. The large Federal deficit requires that the Federal Government borrow large quantities of money in the money markets. In order to attract sufficient funds at home and abroad the government has to pay high interest rates and these high rates encourage large capital inflows which cause a strong dollar. Another reason for the capital flows is the foreign investments that foreign firms are making in the U.S. to avoid the ever-increasing threat of import barriers. Ironically, much of the pressure for the import barriers comes from the crippling effect that the strong dollar has on both our import and export positions. In general, however, there is no escaping the fact that most of the strength of the dollar is the result of our own unfortunate fiscal policy.

It would be foolhardy to predict that the dollar will continue at this level relative to other currencies for the indefinite future. However, at this point there is no evidence of the political will necessary to get our fiscal house in order, and thus, this drag on our exports may continue for some time.

All of these factors -- static demand and the strong dollar -- would be much less of a problem if the nature of our competition had not changed over the last five years. When the export boom began in the early 1970s the U.S. could expand output rapidly by merely returning to use the land which had been idled by farm programs. Moreover, the great flexibility which marks our agricultural system made it possible for us to respond quickly. As a result, the U.S. got the lion's share of the expanded export market through most of the 1970s. In Canada, both area harvested and yield for wheat and coarse grains expanded in the late 1970s. As a result, Canadian wheat exports rose by 50% from 1972/73 to 1982/83, and barley exports rose even faster. In Australia, both acreage and yield also rose, and Australian exports rose at the same time. In Argentina land area did not change so much, but



yields rose very sharply and exports rose accordingly. Those three major competitors doubled their exports of wheat from 1973/74 to 1983/84! Matters have been made worse by the change in the Common Market's position from a large net importer of grain at the beginning of the 1970s to a significant net exporter of grain beginning in 1980/81. This is especially important for wheat where the EC is now the third largest net exporter following the U.S. and Canada. This situation was the result of sharp rises in yields in Europe, not as a result of expanding area.

Much has been made of the effect that the Common Agricultural Policy has had on expanding grain output in the Community. And, there is no question that they could not export with their high internal price level without export subsidies. But, even if all that is true, the fact is that the EC is now a surplus grain producer and is likely to continue to be under any policy that appears to be politically achievable in the foreseeable future. Unfortunately, their surplus production also extends to meat, chickens, and a host of other products. And our increased competition is not limited to these few countries. Brazil has expanded output of soybeans and chickens, Thailand of rice and corn, and the list is growing longer each year.

Both the U.S. and a number of countries have responded to the rise in agricultural commodity prices which occurred in the last decade. As it happened, the U.S. response was quickest, but now we face competition for export markets far beyond what we imagined or projected when we were making our estimates of export markets only a few short years ago.

#### Looking At Policies Regarding Exports

When things are tough in the export market, as they have been for the past three years and will be for some time, there is a tendency to expect the government to fix the problem. There have been a variety of suggestions in this regard, most of which run in the same direction.

One push has been to expand the use of CCC export credit. This has been done to the point that a huge hangover of short-term export credit exists which will have to be extended and renegotiated in the not-too-distant future. We have helped offset the real decline in foreign purchasing power, but the cost is yet to be determined. Moreover, the continued use of short-term credits will grow increasingly inconsistent with the longer-term rescheduling needs of debtor countries.

A second push has been for the use of overt export subsidies, especially to improve our competitive position relative to other suppliers. Apart from the GATT problem, which may be significant, there is an issue of both cost and effectiveness of such subsidies. Unless it can be shown that subsidies will increase total world food consumption, they are more likely to rearrange trade than to help it.

Finally, we hear suggestions that U.S. price supports are too high and provide an unwise umbrella for our competitors. However, at the same time we run large and expensive land retirement programs which do more to encourage our competitors than our price supports.

It is an unfortunate fact that most of the events adversely affecting world trade in farm products are outside the purview of either U.S. domestic farm policy or export policy for agriculture. Farm commodity groups would do well to consider more efforts and support for measures to improve the world economy, for in the absence of such improvement no commodity export policy can be successful.

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Clifford M. Hardin

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There are three major forces affecting American agriculture that can drive a Secretary of Agriculture "up the wall." Two of them -- weather and the value of the dollar -- are unpredictable. The third force is action by the U.S. Congress. Because congressional action is more predictable, it is no less troublesome. Unless there are extraordinary efforts to prevent it, Congress will continue to tie the hands of the Secretary of Agriculture so tightly that he cannot properly adjust to unforeseen shifts in weather and the value of the U.S. dollar relative to other currencies.

The Agricultural Act of 1981 contains some beautiful language giving the Secretary great leeway in adjusting loan levels and target prices in order to maximize exports and total returns to farmers -- but the fine print in the Act takes it all away; the Secretary is told that he can only adjust above certain minimum levels that are specifically provided in the Act for each crop for each year. Furthermore, the Act mandates the creation of a farmer-owned reserve for wheat and corn that could not be marketed for 3 to 5 years.

The result is now history -- with good weather, U.S. farmers set new grain production records; the strengthening of the dollar reduced exports; market prices fell below mandated loan levels, and the largest surpluses in history were locked into the farmer-owned reserve where they were supposed to stay for a minimum of 3 years. Quantities of corn available in the free market this past summer were so small that export orders could not be filled

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and sales were lost. The farm program cost to taxpayers for fiscal 1983 is estimated at \$22 billion, making farm programs the most rapidly growing item in a deficit-plagued budget.

Much of the trouble and cost could have been avoided by giving the Secretary of Agriculture more room to make adjustments.

### The PIK Program

Given the agricultural situation that existed in early 1983, something drastic like PIK had to be invented. Instead of being critical of PIK, however, we should direct our scorn toward a series of Congressional actions culminating in the Agriculture and Food Act of 1981, which helped to create the problem PIK was designed to correct.

The PIK program did provide a way to put stocks of the of the Commodity Credit Corporation and the farmer-owned reserve back into the free market. It is also providing some cash relief to debt-burdened farmers. Even so, however, the longer-term costs will be high. Any successful, U.S. unilateral effort to limit production is an invitation for farmers in competing countries to expand their own production under our price umbrella -- and this is now occurring. This year, farmers in Canada planted more wheat and Argentina planted more corn in response to PIK.

The U.S is now paying a high price for a carelessly constructed agricultural law.

### Rising Interest in Agricultural Policy

Interest in national agricultural policy appears to be rising. In recent months I've heard of plans for the development of five new agricultural policy research centers designed to help the Congress and the Secretary create



more constructive legislation. Three of these centers are being financed by private foundations and two by the federal government. I am not opposed to studying policy alternatives. I think we should, but what worries me is whether the creation of new information will actually result in improved legislation.

For example, I think a majority of us in this room would agree that crop loan levels should be kept below market prices. A majority of us would agree that dairy price supports are too high and should be lowered. A majority of us would also probably agree that unilateral efforts by the U.S. to adjust world grain supplies will turn out to be counterproductive. Many members of the House and Senate know these things, too. Then why do we get so much legislation that is not in the national interest? The answer is that Congress -- through reorganization and restructuring often done in the name of reform -- has lost the ability to control itself. It isn't only in agriculture that we are getting shoddy legislation -- it is occurring pretty much across the board. The single-issue lobbyists, more than any time in history, are having a field day.

#### Government by Subcommittee

There are some of us who are convinced that the single most troublesome problem in the country today is the Congress -- not necessarily its members as individuals -- but the Congress as an institution.

In the past decade, Congress has essentially become a holding company for its legislative subcommittees -- 150 in the House and nearly 100 in the Senate. The subcommittees, composed of legislators who represent constituencies with the highest stakes in a given policy area, gained new powers in 1973. The Subcommittee Bill of Rights conferred on them the

exclusive right to consider all bills and programs falling within their policy jurisdictions. With assured budgets and staffs, they were freed from domination by the full committee chairman.

It is futile to be critical of legislators for taking full advantage of the system. A member of Congress typically is responsive to two major motivations: to be reelected and to develop a power base in the Congress. That is the system. Within the current structure, legislators may not be behaving responsibly, but they surely are acting responsively -- indeed, they are doing so with a vengeance.

In addition to the creation of a system of powerful subcommittees, Congress has, over the past 25 years, also destroyed, often in the name of reform, its institutional methods of self-control and, with them, its capacity for legislative self-governance. Congress once had strong party and institutional leaders. It once had a powerful Rules Committee that could check some of the excesses of the authorizing committees. It once had strong appropriations committees that protected the Treasury from raids by various claimants. But no more. The appropriations process provides one telling indicator: nearly 60 percent of the entire U.S. budget is on virtual "auto-pilot" by which spending is tied automatically to a variety of economic and demographic factors.

The consequence of these events is that each subcommittee has a nearly complete jurisdictional monopoly over some set of policies and programs, including U.S. agriculture. More important, subcommittee members possess veto power over changes in legislation within their policy area. This ensures that no policy change can take place unless it first obtains the blessing of the appropriate subcommittee. Since this involves precisely those congressmen

whose constituents and supporters gain from current policies, it is hardly surprising that subcommittee members are not disposed to alter those policies. Prior to 1973, a full committee maintaining a broader representation of interests could mute the excessive enthusiasms of each of its subcommittees. Today, the subcommittees observe a reciprocity agreement, keeping their noses out of one another's business.

The dairy-price-support program provides one recent example. The current Administration wants price supports reduced because the program has resulted in government ownership of huge and rising stocks of butter, cheese and powdered milk. The House Subcommittee for Livestock, Dairy and Poultry has been successful in preventing decreases in price supports -- and the mountains of surplus dairy products keep growing.

We now have a situation in which the single-issue lobbying groups no longer need to influence a majority of the members of a full committee in order to get its way. Now a half dozen members of the appropriate subcommittee may be sufficient to block a proposed legislative initiative. Perhaps this helps explain why agricultural commodity groups seem to have gained in influence at the expense of the general farm organizations.

It is sometimes suggested that the growth in lobbying activity is a major reason for the growth in governmental excesses. Lobbying groups do have great influence, but their growth in recent years is more a consequence than a cause. Lobbying has expanded in response to the growth and power of subcommittees. Given the existence of powerful, narrowly focused subcommittees, it pays organizations and firms to have Washington representatives work closely with subcommittee members. Lobbying has grown because in the new environment, it gets results.

Unless and until Congress puts its two houses in better order, it will be extremely difficult to make significant progress in solving some of our most serious economic problems, including constructive agricultural legislation and reducing the annual budget deficits. Many members of Congress recognize that something in the legislative process has gone wrong -- witness the bills proposed to balance the budget, to provide for a legislative veto, or to institute periodic review of major statutes through "sunset" legislation. But such proposals miss the mark; they are symbolic shots at executive branch bureaucrats that fail to pin spending and regulatory excesses on their true causes -- the decline of institutional restraints and the growth in power of congressional subcommittees.

Put more constructively, the Congress must reestablish the checks it once had on the powers of committees and subcommittees. Institutional changes that would help to promote national interest include: (1) revitalizing the appropriations committees, permitting them to incorporate spending reductions in what are now considered to be permanent appropriations for "entitlements"; (2) strengthening the Rules Committee; (3) reversing some of the autonomy given subcommittees; and (4) integrating the president more fully in the legislative process. In addition, the Budget Act of 1974 should be treated as a nine-year experiment in "moral persuasion" that has simply not stood up against the spending propensities of subcommittees. Teeth and backbone are required -- Congress must either grant more formal (and formidable) powers or scrap the process entirely. This list, however, is by no means exhaustive of all positive changes, nor are these suggestions totally free from flaws of their own. But they would be a good place to start.



If Congress decides to restructure itself, it will do so only because the public understands what is occurring and voices sufficient indignation. Appropriate restructuring will occur when bipartisan groups of congressmen and senators decide that the welfare of the nation requires such a change. It will require a form of true statesmanship that has become rare in the current state of congressional affairs.

For those concerned with agricultural programs and a constructive farm bill in 1985, the development of a program is not enough. Attention must also be given to how to move it through the Congress without amendments that destroy its effectiveness.

Earl L. Butz

Session 28 - November 2, 1983



This is your 60th Outlook Conference I understand, and I got to checking up. It was just 53 years ago that I had my first contact with this Department at the National 4-H club camp. In those days, we camped in tents out here on the mall. That very first night, a rainy night, they had a vesper service over in the patio in the Administration Building, where squatted on the floor as we were at that time, I met a young lady from North Carolina who later became Mrs. Butz, so -- this Department has -- and, after 46 years, she still is, that's kind of unusual these days.

In fact we had our anniversary, and somebody said 45 years, did you ever think of divorce? She said divorce never, murder often.

Nevertheless I'm limited to 20 minutes, and a politician cannot even say hello in 20 minutes, Dick, for goodness sakes. And you took five of it here with that unnecessary introduction.

But here we are. This is supposed to be a bipartisan discussion, and there are empty spots for

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Democrat Secretaries here that for some reasons didn't show. And frankly, I hope they keep up that track record. I kind of like that.

But as Dick said, he phoned Sunday night for the social conversation, I think, and Dick wanted to say, Earl the format's been changed. We plan to have four members of the panel, and I was going to chair the panel, and earlier they said don't prepare anything, fortunately assuming we might. They said don't prepare anything.

Sunday night, he said there are just going to be two of you there, you've got to make a 20 minute speech. He says don't write it out. I appreciated that, because unlike Dick, and unlike Cliff, I have no speech writers now. And I obviously couldn't write it out, so here I am. And Dick says make it kind of bipartisan, at least don't make it part~~x~~isan, and I said bipartisan?

Dick, I think I can do that. Like these two American tourists were in England, out in the country side of England, this regimen of Scotch highlanders came marching over the hill dressed in their native kilts, at a distance away, and the one American turned to the other and says Golly, Ned, they've got women in the British army! Oh, I don't think so, says the first American I'll go see. Presently he came back and he said we're both wrong, it's the Middlesex regiment.

So we will Middlesex here today if we can do it some way or other.

Dick was kind of establishing this program as a Purdue program, and he failed to mention that John Martin, who buttons this thing up, also got a degree at Purdue, John, I think. And this, as far as ag economics is concerned, can be called the school of market economics orientation I think. We've always kind of had a prejudice in that direction. In spite of the fact that we're in one devil of a mess here right now.

The topic today was historical perspective. And I'm not sure what that means, I think it means that a historical perspective, you look back. There's nothing much you can do looking back, it's not always useful to look back, it's sometimes pleasant to look back. Last night, I spoke in Carnie, Nebraska. I had to get to Omaha late last night to take off for this place today. You can't get anyplace starting from Carnie, Nebraska.

We came in in an executive jet, and I sat up with the pilot. As we came down to that runway there, he put the plane down very promptly at the end of that runway and brought it to a halt. When he got it stopped, I turned to him and I said, 'You put that plane down pretty promptly on the runway back there, didn't you?' He paused a moment, looked at me with kind of a knowing laugh. He said "We've got a saying among pilots. You can't use the runway behind you."

You can't use the runway behind you, what a philosopher he was. You could write a whole book on that, a pretty good book on that subject.



And I on the plane coming in this morning took a look at this and it says historical perspective, former Secretary's appraisal. Well, that's really compounding ignorance upon ignorance, I think, when you do that. But it is useful to look back.

When President Harry Truman wrote his oral autobiography that Merrell Miller wrote, Truman was a great student of history. So frequently in that book, if you read it, Truman is quoted as saying "The only new thing in this world is history you haven't read." And recently, we haven't been reading the history.

I think that's what Cliff had to say about what comes out of the Congress up here. Cliff, that was a great speech, I just wish you had made it on the hill!

MR. HARDIN: I'd like to.

MR. BUTZ: You'd have gotten a different reaction.

We preach to the converted, and that's the basic problem here, I think.

I've been around here long enough, I can vaguely remember the McNurny-Hogen debate of the 20s when I was in high school. I can recall candidate for President Herbert Hoover's closing campaign speech. In late October, early November, whenever it was, in 1920, that he gave in St. Louis, Cliff. It was on the radio. And he addressed the farm problem. And he said I'm going

to appoint a Federal Farm Board, and I'm going to give it 500 million dollars to stem the tide of low prices we were then experiencing. And he did appoint a Federal Farm Board, and Congress did appropriate 500 million dollars, but in 18 months, it was dissipated, it was gone, he simply couldn't stem the tide.

Then we lived through that whole batch of New Deal farm legislation, the triple A -- attempts to cut back, birth control programs for cows and for sows -- neither the cows nor the sows read about it -- prices always at an incentive level, prices always encouraging production with attempts to curtail it by buying it one way or another, they didn't work very well. Then came the other programs that came along, then came World War II, when our fellow Hoosier Claude Wyker was Secretary of Agriculture in this Department. And Claude coined a very catchy phrase. "Food will win the war and right the peace". And that went across out in the country, and the goal was for increased production. And we had incentives to increase production.

Those incentives finally evolved as 90 percent of parity price supports. Rigid, no discretion with the Secretary. We're going to encourage production, and brother, we did encourage production. A great deal.

And got into trouble. And I recall when I came down here as Assistant Secretary in 1954, with Ezra Benson as Secretary, Public Law 480 had just been passed. The Food for Peace program was just in the process of being formulated. A great new concept, we're going to move this stuff abroad. Foreign countries don't have dollars, they've got their own currency. We'll sell it to them in their own currency, they've got plenty of that. In the process, we accumulated enough Yugoslav dinards and Indian rupees to paper every wall in this building.

As far as I know, we've still got them. They're not very useful except in those countries, and not too useful there. But anyway --

But anyway -- we were accumulating supplies, and the big fight then was with the Congress, are we going to get flexible levels of farm price supports. Are we going to somehow get off this 90 percent of parity binge we're on. Are we going to give the Secretary some latitude so we can set price supports that Cliff Hardin was talking about awhile ago. And I recall just about the first week I got here, as Assistant Secretary, Horace Wells

the head of the old Bureau of Ag Economics -- and Horace, that old Mississippi economics of his, which turned out to be pretty sound after being exposed to some northerners-- was on that side, and I passed the Act, giving the Secretary some latitude, between 60 and 90 percent of parity except for dairy which was 75 and 90 percent of parity, you always get special treatment on dairy -- because everyone of our 48 lower states have dairy in them, and that means there are 96 members of the Senate who are aware of the third largest pack program in the United States, namely the dairy industry. And we got a lot of honest people on the hill up here, when you buy them, they stay bought.

If ever asked to define honesty, that's the way I define it.

And then came along the period of the 70s, late 60s and early 70s, when Cliff was Secretary and I was Secretary, and I had the good fortune to be here when exports started up, when there were some crop failures around the world, when the Russians decided they'd better give their people a little meat, more protein, and they had to have some feed grains and oil seeds to do it. And prices started up, and prices went up, and that was very popular out in the farm belt. Somebody said Butz advocated planting fence row to fence row. I didn't advocate that, the market advocated that.

And that's essentially what farmers did in



response to market prices. They're not stupid, the market prices said produce more, and they did. And we got all that added production there, and then came a time when those price levels began to send a signal to our competition around the world, as Cliff said while ago. And they too got in the business. Now, I want to take issue with Cliff awhile ago on this strong dollar. I don't think the strong dollar makes a doggone bit of difference on exports in the current situation. Because our competition, having produced it, are going to sell it at whatever price it takes to move it. And they're just going to undersell us by 10 dollars a ton or whatever it takes to move whatever they've got, they don't ask if the dollar is strong or weak. In the longer run, that may be a factor, but in a given situation, having induced our competition to expand production, as we have with our high level of price supports which essentially put a floor on world prices, and we've sent a signal to the rest of the world essentially, that we've taken a price risk out of production for you for the four years this Ag Act is going to persist. The history has been that we always renew it the same way. We've taken the price risk out, you go out and put resources into production. Develop irrigation, develop drainage, put marginal land into production. There will be a market for it at not less than the American loan rate minus transportation cost, whatever it is.

And I think in the short run, and the short run gets longer each year in this case, I think in the short run that having done that, we automatically induce competition in the export markets regardless of whether our dollar is strong or weak. So that's part of the basic problem, now let's go on, and I say I've lived through that, and it's an interesting thing.

And now we're back again to the point where we've got excessive levels of price supports. The question was asked of Secretary Hardin, didn't you support, didn't the White House support the Farm Act of 1981, the Reagan administration, didn't they support it? Bill Leshner is going to address himself to that later, I am sure. They tried to keep the rates down. The White House has always done that. No Director of OMB, be he Democrat or Republican, likes to have the kind of costly program we've gotten out of ourselves into.

The White House pressure is always on this side of modest levels of loan rates and price supports. That was true of President Carter. If you recall in the early years of the Carter administration. Three times, he threatened to veto the Farm Bill going to Congress. He said it's too costly, it's got the level of price supports too high, it's going to get our competition out of business it's going to hurt our export markets. Three times he threatened to veto it. And the Congress knew he didn't mean it. Because up to that point, he had only exercised

the veto power twice, I forgot what the first one was, the second time, he vetoed a bill providing for compulsory inspection of imported rabbit meat.

There's just a little tilt politically, you can detect that here --

Reminds me of that chap I knew back home, he married Millie and he lived happily with Millie for many years, and Millie died, and he buried her out in the local cemetery. A few years later, he married Tillie, and lived with her for years happily, and she died, and he buried her six feet away from Millie. Two years later, he died. They opened his strongbox in the bank, and they found his will. His will said bury me between Millie and Tillie, but tilt me a little toward Tillie.

You may find me tilting a little here, sometimes.

But that brings us up to where we are now, and I want to say just a few words about I think outlook people ought to be doing in the United States, in our 50 states. Whether you're with the colleges, or publications, or some industrial organization. I'm convinced myself that the leavening factor in good government in this country is the low level of economic literacy of the electorate. This is a serious thing.

Those that think you can legislate prices, those that think you can force people to buy regardless of the price, those who think you can bribe farmers into

cutting production by price supports or loan rates, without the kind of tight controls we've got in the tobacco areas in the southeast, for example, -- those who think that right now the way to go is to raise the price of wheat up, and cut back production. Week after next, I'm talking to the Kansas Wheat Growers in Wichita, it'll be the last talk I ever give to them --

Just to warn you Kansans here, I'm going to tell them you've got to get the price of wheat down, or get out of the wheat business, that's the alternatives.

We're geared to export over half the wheat we produce in this country, or cut back production. We're geared to export over half the soy beans we produce in this country, or cut back production. We're geared to export a third of the feed grains we produce in this country, or cut back production. And I'm going to say the choice between you fellows -- that you fellow face out here is between a cut back program on acreage restrictions where you can play games with the government, you know, this funny business, you know, can I put the swamps in and the sand dunes in and that kind of stuff. Or a card that you get punched when you sell a bushel, and when the card is punched, you quit selling. Now, that's a different ballgame. That's a right ballgame. That's not a popular one. That's one that really puts you out of business. And those are the alternatives.

But what's that got to do with outlook. For



years, you fellows have said we'll use the outlook as a vehicle for economic education. I think you have. use it as a vehicle for fundamental programs and fundamental price education, and I think you have. What a marvelous laboratory we have here now, to use that as a vehicle for fundamental education in pricing. We have priced ourselves out of the market. We've got a program born in the days when we had essentially a domestic market. Trying to operate in the days when we're fifty percent export market in our basic grains and cotton. And it's a different ballgame, and I think we've got -- I think we need to get that program out.

The --we've got to talk about whether we want less government controls or more government controls. Do we want to move toward the market that they taught us about in fundamental economics when we were in college, or do we want to move away from that? Do we want the long arm of government reaching out to these people, telling how much you can grow, what you can grow, what you can market, when you can sell it -- as we see our world markets vanish before our very eyes. I think we've got a marvelous laboratory now to teach that. We can teach that government is not a market. We can teach that butter stored in a Missouri cave has not been marketed.

It's going to come out somehow, and go back into the channels of distribution somewhere. We can teach that the farmer owned reserve, call it what you will,

was not a market. It hadn't been marketed. And we're not going to destroy it, not going to dump it in the ocean. It's not going to go out of condition, not a bushel, because that would make a headline in the Chicago Tribune, Dick Orr. We're going to be kind of careful about that. It's going to be marketed. It's going to come back in, somehow or other. And price is going to be a determining factor to get that job done. Cliff mentioned the dairy program in this country, in shambles, costing 2.75 billion dollars a year now. Why? Because this government sent a signal to our dairy farmers, a price signal to our dairy farmers, we want more milk. And dairy farmers not being stupid produced more milk.

At the same time, they sent a price signal to consumers, eat less cheese. And consumers not being stupid, ate less cheese. And we got ourselves in this mess. You could predict it. It's the way we operate, we responded perfectly logically to the wrong signals. And that's what we're talking about today, and I think you've got a wonderful opportunity for basic economic education -- but time is slipping here.

As one who's a long time professor, I'm automatically wired for 50 minutes, I'm in trouble here, Dick, right now.

Like my preacher, when he starts a sermon, he has a habit of dropping a cough drop in his mouth. When his cough drop has dissolved, he ends his sermon. Three days ago, by mistake, he popped in a button. As far as I now, he's preaching yet. I walked out on him.

Another area in which you can do economic education that I'm quite concerned about. That's this matter of the consumer attitude toward the whole food industry in this country. Right now, nobody's very mad at us, we've been on a plateau on food prices for retail for some while. Nobody is writing editorials against us, there are no crusaders waiving flags for beef boycotts and that kind of stuff. I just read in the morning Omaha paper dispatched out of this town that I suppose was said here yesterday, food prices last year rose 2.5 percent. Next year, you indicated, Bill Leshner, I read, 4 to 7 percent, is that right? Well, I'll take my side of the 7 percent instead of the 4, and if you said four, I think you were talking about the PIK program there, and that's before you persuaded God to sign up in PIK.

And when you got God to join up, between the two of you, you really overdid it here. But -- a seven percent increase next year is going to create a new Ralph Nadar by a different name, whose going to -- a new Carol Foreman by a different name, to come back to my good friend who was four years Assistant Secretary here -- one who when I was Secretary, attacked me every morning and I fought her back, it was good for both of us.

I was the best fund raiser she had.

There will be a new winner rise next year, and they'll get some group of housewives somewhere with a sign

painter and a tv camera, and if you've got a sign painter and a tv camera, you can get six women to march for anything in this country -- and it's -- or six men, I've got to get that right now -- I got a negative response down here on the front row on that one --

You can get them to march for anything in this country. It makes the evening network, and I want to tell you, it's popular, because this very day in this nation, tens of millions of housewives passed the checkout at the supermarket with a subconscious feeling, somebody's ripping me off on food, if I just didn't have to spend money for food -- and let the headlines say that last year, the index, or last month, the index of food prices rose six tenths of one percent, and that becomes bold headlines, I want to tell you -- that's coming next year.

And I think those of us in this business ought to do some basic economic education right now, when nobody's very mad at us about two or three things. One is -- food's a bargain, I won't go into that. You understand it. Second is, that our producers only get a third of the consumer's food dollar on the average. Where do the other two-thirds go? I think we've got to work on that other two-thirds. Those of us in agriculture have to work on it. We've got to make the consuming public aware that that's a pretty big hole in the sieve.



What do we work on? Well, in colleges we work on efficiency, and this and that. We're kind of afraid to tackle some of the real problems. A little while back, just to illustrate, a little while back, Mrs. Butz said I'm having company in a couple of nights, get about a 7 pound pork loin roast, she said. She said I don't want it big, I don't want it fat, I don't want it bony, I don't want it gristly. Now, she was talking about a pig we haven't bred yet.

I had a rough idea what she had in mind. I went to my local supermarket, 4:30 in the afternoon. There were these pork loin roasts wrapped up there, about three and a half, four pounds, too big, too bony, not what I wanted. I saw the man in the apron, young man in the apron behind the counter, I said I'd like to get about a seven pound loin roast from a small loin. He said, well, they're out there on the counter, help yourself. I said no, there's nothing there I want. I said you've got a small loin hanging in the collar back there. Bring it out and show it to me, we'll cut a roast out of the middle, I'll pay you for it. No, I can't do it, he said, I'm the meat wrapper.

My little town, not Chicago or St. Louis, the little town where I live. I'm the meat wrapper. I said, You're the what? He said I'm the meat wrapper, the meat

cutter went home at 4:00. I said you mean to tell me you can't bring a loin out and cut a roast up, and he said no sir, you come back in the morning, and the meat cutter will cut it, and I will wrap it for you.

I saw the store manager. I said tell me about that mess behind the counter. That's right, he said, I can't afford to keep a meat cutter after 4 o'clock when he goes into time and a half, and on weekends, he goes into double time, I just can't afford that. I said what does that meat wrapper get paid? He gets \$7.10 an hour. Add your perks in. Well, about \$9 or \$10 an hour. The meat cutter, I said, is better paid. Oh, sure, he said, and he pulled the contract out on his desk, he said he gets \$10.025 an hour. Add your perks in. Well, about \$15 an hour, he said. I just can't put him into overtime.

I said how long does that meat wrapper work to become a meat cutter? He said four years. I said holy smokes, I'll teach him how to cut meat in four hours, -- oh, no, you can't he said. I said then well give me four weeks, or I'll quit. Well, it takes four years. I paid too much for the loin roast -- the farmer got too little for the pig, because one man couldn't pick up a butcher knife, the other man couldn't pick up a piece of wax paper.

Now, in my book, that kind of damn foolishness has got to stop.

And I think we've got to have courage enough to expose those kinds of inefficiencies in this whole food distribution system.

One third of the tonnage of grains we send to Russia has to go in American flag bottoms. We rule ourselves out of that competitive market the day we load the boats in New Orleans. All of our PL 480 shipments, if I remember correctly, have to go in American flag bottoms, and I've got nothing against American flag bottoms, I just wish they'd work, that's all.

And we ruled ourselves out of that market the day we load the boats. I went up to the south end of Lake Michican awhile back, port of Indiana. There's a two year old elevator there, completely automatic. You punch a button and the grain flows someplace. They were loading the boat with corn, destination Russia. I asked the elevator manager, are you loading that boat? Oh, no, no, the longshoremen are loading that boat. I said how many longshoremen are working out there, he says there's one working, I'm paying five. One working and I'm paying five. I said tell me about it. He said well, the rules call for five, but it just takes one out there to make sure the spouts in the hole to the right ship, it's all

automatic. I said where are the other four? Well, they punched in this morning, and they're down at the local tavern, tonight they'll punch out. Tomorrow, that guy will be at the tavern and somebody else will be out there. Why don't you get a camera out there and take a picture of it and put it in the morning paper and make somebody mad? What? Get my tires slashed? That's the least that would happen to me.

Now, I'd like to see you guys take some of that stuff on. I'd like to see us expose some of these gross inefficiencies we've got in the food processing and distribution chain in this country. It's the other side of this coin, the other way to expand our markets. To go after them. We've made our production pretty efficient. We're pretty good on that. This two thirds of this price and retail counter after it leaves the farm, it's got a lot of inefficiencies in it. My time's up.

The notes I made this morning are still unspoken. That runway ahead, that runway ahead, it looks good. It looks good. Cliff projected that by 1990 and you had exports up pretty good by 1990 --the world population growing, the stork still outruns the plow in most parts of the world -- as nearly as I can tell, he's going to keep on doing it -- especially with that married students' village at Purdue University, he's



really racing there --

We've got this tremendous American bread basket. Every source unique on the face of the earth. From Ohio on the east, to the Rockies on the west, Canada north, to the high plains of Texas on the south -- somebody's going to be offended because I didn't put in the Delta area or something like that -- the world's largest contiguous land mass, with fertile soil, with adequate rainfall in most years to do the kind of farming we do, with that marvelous temperate climate, long periods of sunlight in July and August, right when the corn plants doing his job, level land that lends itself to mechanical operation, therefore low cost operation, highly capitalized farmers, high management capacity farmers, a good research extension infrastructure to get the job done -- that marvelous water transportation system right down through the middle of it that makes Peoria, Illinois, almost as close to Rotterdam as Springfield, Massachusetts, almost as close, but not quite. This is a resource absolutely unequaled on the face of the earth.

And by these stupid pricing policies we follow, we're cutting back. The world's most efficient area, and we're hobbling ourselves. We're encouraging less efficient areas to expand, to move into the markets that we guarantee them if they'd just undersell us just a bit

But if we can do what Cliff does, if we can -- what Cliff said, if we can develop country sentiment, that there's something basically good about becoming competitive again. It takes courage to do that. It took courage for Bob Dole, up here in the Senate from the wheat producing state of Kansas, to come out in support of taking 30 cents off the support price for wheat. I think Bob did that. It took courage to do that. It's not because Bob wanted his Kansas farmers to get less for wheat, he just wanted to stay in the wheat business. That's a very simple one.

It takes courage for Bob Delano, of the American Farm Bureau Federation, with organizations in 49 of our states, farm organizations -- It takes courage for him to go on the hill up here and say we've got to get those loan rates down. We've got to stop the escalation in target prices. That's not because he wants his farmers to get less, he wants them to stay in business.

I think those of us in outlook work right now have a tremendous opportunity to teach basic economics that if you pursue the course that this Congress has been dictating, you're going to go out of business. If you want to stay in business, give some flexibility to the Secretary of Agriculture. Because most Secretaries of Agriculture are almost as wise as Cliff Hardin and Earl Butz. Thank you very much.

Farm Policy Update and Perspective

It is a pleasure to have this opportunity to discuss the status of current farm policy, especially at such a critical time for American agriculture. Since the passage of the 1981 Farm Bill, much has happened that has presented new challenges for agriculture on almost a daily basis.

The 1981 Farm Bill

At the time the 1981 Farm Bill was formulated, the main concern was that world food needs would outpace production. Many believed--inside and outside of government--that the agricultural issue of the 1980's was going to be how to produce enough for a starving world rather than surpluses. Many also believed that the United States was the only country that possessed the potential to expand food production enough to meet world needs. During the decade of the 1970's, the volume of U.S. exports increased 150 percent in response to the growing world demand. This growth in world demand is evidenced by an increase of nearly a third in world grain consumption and a rise in oilseed consumption of over 50 percent. The story is similar for other major farm commodities produced in the U.S.

At the same time, there was great concern over inflation and rising production costs. Inflation was running at double digit rates, the prime interest rate was around 20 percent and inflationary psychology was influencing all business decisions.

Thus, the 1981 Farm Bill was developed in a climate of extreme optimism for growth in exports and pessimism over controlling inflation rates as land prices were escalating beyond what any farmer could pay for out of production revenues. Even with this environment the Administration believed that conditions could change and sent a bill before Congress that contained no minimum commodity loan rates

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Paper prepared for delivery by William G. Leshner, Assistant Secretary for Economics, U.S. Department of Agriculture, at the 60th Annual Outlook Conference, November 2, 1983, Washington, D.C.

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or target prices. It also had flexibility concerning the dairy price support level. In other words, the bill we developed would have given the Secretary of Agriculture more discretionary authority for controlling price support levels and farm program costs. At that time, it had become evident that indexed entitlement programs were causing a major part of the budget deficit problem.

While the 1981 Farm Bill that was eventually signed contained provisions for higher loan rate minimums (though not escalated through the life of the bill) and annual target price increases of 3 to 5 percent, it appeared workable. At the same time, it seemed to represent an effective compromise between our initial bill and the signed Farm Bill that many in Congress viewed as containing support levels that were much too low.

I would like to remind you that the 1981 Farm Bill passed the House of Representatives by only two votes. And, the closeness of the vote was because it provided too little to farmers and not too much. Indeed, many in the Congress and elsewhere called it a "do nothing" bill for farmers. At that time, the Administration was criticized repeatedly for being too worried about budget deficits and not enough about farmers. Some suggested that farm incomes would drop because loan rates were too low.

#### What Happened?

Now look what has happened in just two and a half years--the Farm Bill we thought was potentially workable at the time has become unworkable in almost lightning speed. The rigid price support levels set in the 1981 Farm Bill have come back to haunt agriculture by working against us in a time of very competitive world markets. The target prices thought to provide only moderate income support turned out so high that they were inducing increased production both here and abroad.



How could all this happen in such a short time span? First of all, the world became gripped in the worst and most pervasive recession in modern history. With this came a downturn in world demand that saw our export volume decline for the first time in 13 years. A sharp rise in debt worldwide, especially among middle and lower income countries, restricted the ability of many countries to import since an increasingly larger portion of their income was required to service debt. In addition, the rise in debt reduced available credit needed to finance imports. Thus, as the financial condition of many of our prominent foreign customers, such as Eastern Europe, Mexico and Brazil steadily worsened, their purchases from us plummeted. Our export volume this year is projected to be 12 percent below 1980--the third straight year of decline.

Meanwhile, the value of the dollar steadily increased as foreign investors sought the security and high rates of return from American investments. The increase in the value of the dollar meant that our products were becoming more expensive in terms of the local currencies of our foreign customers. Thus, American products became less competitive in world markets and our volume of trade suffered. As an example, over the past two and a half years, the dollar has increased in value by about 50 percent compared with the German mark. This means that even if the U.S. price had remained the same over the past two and a half years, the price in German currency would now be 50 percent higher. Such effective price increases are bound to reduce demand.

To make matters worse, the downturn in world demand was accompanied by increased tariffs and subsidization practices by some of our major foreign competitors--most notably the European Community (EC). For example, the EC just recently increased its subsidy for wheat flour in order to take over a larger portion of the Egyptian wheat flour market--a market that the EC could not sell one bushel into without massive subsidies. Other countries such as Japan continue their policies of

limiting access of certain agricultural products through quotas and non-tariff trade barriers.

Other factors beyond anyone's control, such as the weather, also compounded our problems during this period of stagnant demand. Unusually good weather worldwide during the 1981 and 1982 growing seasons resulted in record crops at home and good crops abroad. While we are appreciative of bountiful harvests, the record grain harvest of 1981 and 1982 came at a time of slack demand and resulted in the largest surpluses in history. The large surpluses continued to overhang the market until this year, and this led to reduced prices and incomes for many farmers. The price of corn last fall at local elevators was below \$2 per bushel, while the price of cotton was under 60 cents a pound. Many other commodity prices were also depressed.

#### PIK--A Temporary Measure

By the fall of 1982, it became obvious that the traditional commodity programs were insufficient to deal with the huge surpluses on hand. In fact, certain aspects of these programs were encouraging more to be produced. With budget outlays soaring, paid cash diversion programs of the magnitude needed would have been irresponsible from a budget standpoint. Moreover, such programs would not have resulted in the necessary acreage reduction since the payment limitation would have restricted program participation. Voluntary acreage programs of traditional size and type had proven ineffective in reducing supplies since yield increases largely offset the reductions in acreage. A special program was needed to specifically address the immediate needs of agriculture. At that time, we formulated the PIK plan and went before Congress to seek approval. After failing to gain Congressional approval for two changes in current law needed to operate the PIK program as we had envisioned it, we later implemented a revised version of the PIK program in January under existing authority.

As a stopgap measure, PIK was the best alternative available to deal with the record surpluses overhanging the market. Simply put, it did not short the market and was the least costly approach since it used government stocks and secured loans as payment for the acreage taken out of production. This contrasts greatly to a paid cash diversion approach which would have extended budget exposure and shorted the market.

The PIK program did what it was intended to do--reduce acreage and potential production while maintaining adequate supplies and putting farmers on a sounder financial footing. However, in combination with the worst drought in 50 years, crop supplies were reduced more than initially expected. Although we did not expect a drought as extreme and widespread, there still will be enough grain and cotton to satisfy all domestic and foreign needs.

Feed grain supplies are now much lower than earlier anticipated due to the drought. In fact, current corn production is estimated about 2 billion bushels below what crop expectations were in early July. However, due to record carryin stocks, corn supplies this year will still be large enough to satisfy total needs and leave carryout stocks near the levels experienced in the mid-1970's. Also, carryout stocks for cotton and rice are now expected to be about 50 percent lower as a result of PIK, near more reasonable levels. Record wheat yields were experienced as most wheat types were mature prior to the drought. These yields sharply reduced the effects of our acreage reduction efforts to reduce excessive wheat supplies. Although estimated ending 1983 wheat stocks, at 1.47 billion bushels, are above the desired range, without the PIK program ending stocks would have been a fifth larger.

#### What Have We Learned?

Now that we have experienced the largest surpluses in history, the largest acreage reduction ever, and the worst drought in a half century--all this in just

over two years--what have we learned? The one thing that sticks in my mind is that no one can predict the future, and that agricultural policy must be flexible in order to respond to the quick and drastic changes that can affect it.

To me it is clear that the rigid price supports of the 1981 Farm Bill helped cause our record surpluses and farm price support outlays. The mandated support prices, above market clearing levels, reduced our competitiveness in world markets. And what is worse is that these policies are still in effect. These are policies that encourage production when at the same time we have implemented the largest acreage reduction program ever.

Our concerted efforts this past spring and summer to get the statutory changes needed with regard to more reasonable target prices were largely futile. While it seems that there is a solid majority in the Senate and House of Representatives favoring these necessary changes, the will of the majority was thwarted by a small minority, and in my view, to the long-term detriment of agriculture. Now, it appears that it is almost impossible to get new legislation, or approval for changes needed in current law, to make farm programs more effective as the conditions and economic environment change. We must remember this for the next farm bill and build in the flexibility that is needed at the beginning rather than count on mid-course corrections.

Take dairy as another example. Over two years ago, we took extensive action to try to bring the dairy program under control. At the time, federal outlays for that program were projected to exceed \$2.0 billion annually, an average of about \$10,000 per commercial dairy farm. In 1982, after months of debate, we ended up with an assessment program that came out of a Congressional conference. Nobody liked the solution although it was adopted over the Administration's opposition and added to a larger government-wide budget saving package that had to be implemented. We were then forced to implement the assessment program to help curb the enormous costs of the dairy program. It was the only tool that Congress



gave us to deal with the dairy problem. Today, after three years of annual cost over \$2 billion, we still do not have a workable dairy program.

Effective agricultural policy does not come easy. Furthermore, we have seen that rigid long-term policy is dangerous. Now that we have reduced stocks, it is critical to formulate future farm policy that will insure that we do not return to the pitfalls of just a short time ago.

In short, for the past two and a half years we have been struggling with farm legislation that was designed for an economic environment that never materialized. Frustrated in our attempts to obtain congressional approval for needed changes in legislative authority that was too rigid, we have attempted to hold the farm economy together with a series of actions designed to minimize the damage, as well as continue to try to position this sector of the economy for a much needed correction. Nevertheless, it has become apparent that we will have to live with this uncertain situation for awhile longer--at least until we get the flexibility that is required to keep agriculture out of the surplus situations we have endured recently and will allow us to meet unforeseen situations.

#### Where Do We Go From Here?

I believe that we have reached a critical point--a watershed period--for agricultural policy. That is, I believe that we will irreparably damage our farm and agribusiness economies, and thus the total economic standing of the U.S., if we do not develop and implement an appropriate agricultural policy soon. I am, of course, talking about the 1985 Farm Bill.

At this stage, in preparing for the debate over the 1985 Farm Bill, it is important that everyone with a stake in the future of U.S. agriculture--producers, consumers, processors, marketers, suppliers--get involved now. We at the Department have been encouraging this. We did it through the Ag Summit last July. We have done it in speeches across the country; and most recently at this the 60th

Annual Agricultural Outlook Conference. We have constantly and consistently carried the message to everyone who should be concerned to get involved--this is the time to formulate ideas, do analyses, elaborate positions, and discuss issues. The reason we have done so is that we believe that agriculture is the most important and efficient industry in this Nation and that we risk making it much less so by depending on factors not related to market forces.

I want to caution you, however. I do not necessarily believe we need to start all over. The foundations for a new agricultural policy exist. I am fearful that the 1985 Farm Bill debate will focus too much attention on some non-productive, non-traditional proposals. For this reason, I would now like to turn to what I think are some of the more important areas we should examine.

The Size and Distribution of Benefits. One basic question going into the debate on the 1985 Farm Bill could very well be the amount and type of income transfer from the non-farm to the farm sector. Farm program costs have gone from \$4 billion in FY 1981 to about \$19 billion in FY 1983, due largely to high support and target price levels. With large Federal budget deficits and, consequently, cutbacks in many domestic programs, the concern that public support for farm programs could wane is very real. I believe that the public will probably continue to support a reasonable level of income protection for the farm sector, but there appears to be increasing public disfavor over the size of farm program costs. As a result, there is going to be much more interest in who should receive the benefits.

Several decades ago there was general public concern that some type of income transfer to the farm sector was needed to improve the quality of farm life. During more modern times there appears to be no disparity between the quality of farm life and nonfarm life. In fact, there appears to be a "back-to-the-farm" movement at the present time. Today most people are on the farm because they want to be there, and not because they are forced.

Furthermore, about 12 percent of today's farms market about two-thirds of all farm products. The average family income of this group of farms is over \$65,000, well above the median family income of nonfarm families. In addition, 60 percent of all farms account for only 10 percent of total farm sales. But, this group of farms only relies on farming for one-sixth of their incomes. The remaining 28 percent of farms account for about a fourth of all farm sales and receive about 60 percent of their income from the farm.

In other words, agriculture and farm life have changed drastically in the last few decades. And, the time is approaching when the public will require a comprehensive review of the degree and distribution of income protection provided to the farm sector, and the legitimacy or need for achieving the stated objectives.

Given that the public will continue to support agriculture to insure a continuous, adequate and wholesome supply of food, who should receive this support and by what means? Should there be a payment limitation or should producers be provided income protection in direct proportion to their output? Should there be leverage placed on recipients of program benefits with regard to performance criteria concerning sound soil and water conservation practices? These are all fundamental questions that will receive careful scrutiny for the 1985 Farm Bill debate.

No matter what the size or distribution of farm program benefits eventually turn out to be, I believe one thing is for certain: income transfer to the farm sector should not be made in such a way that it disrupts resource allocations and distorts market signals. Our recent experience with large crop surpluses and depressed prices is a prime example of what can happen when farmers produce for Federal programs and not the market. High program costs, large surpluses, and low prices are the results.

Acreage Reduction Programs. We also need to take a closer look at our acreage control programs with regard to future farm policy. Should we have them given

the fact that no other country cuts back, for example, its wheat production? Are such cutbacks really effective? If we are going to have them but they are not currently effective, can they be made to be more effective? Questions like these must be asked--we just witnessed the need for the most massive acreage reduction program in history on the heels of modest acreage reduction programs.

A look at recent commodity programs suggests that limited acreage reduction programs are largely ineffective, especially if there is unusually good weather which results in record yields. In great contrast to the drought we suffered this year, in 1982 we experienced record corn and wheat crops despite acreage reduction programs of 10 and 15 percent, respectively.

However, weather is not the only reason that the 1982 and other modest acreage reduction programs were largely ineffective. First of all, we know that producers take their worst land out of production first--it's just natural to do that. Secondly, the effectiveness of recent programs has been restricted since some of the larger farms are precluded from participation by the payment limitation. This certainly includes some of the 12 percent of farms that account for about two-thirds of all farm cash receipts. Thirdly, it appears that some of the more efficient producers outside the programs expand production in the face of commodity programs, knowing that the government will try to support prices by higher loan and target prices, storage programs, PIK programs or whatever it takes. As an example, corn yields on participating farms in 1982 averaged about 12 percent below the national average while wheat yields on participating farms were nearly 20 percent below average.

This indicates that recent farm programs have tended to shelter some of the less productive farmers while encouraging others to produce to their fullest capacity. They know the government will foster higher prices by whatever means available when facing such large budget exposure.



Some have suggested that we might be able to tighten up acreage reduction programs to make them more effective. As we have seen, the very nature of limited acreage reduction programs makes this difficult at best. Others have suggested cross compliance as a means of shoring up acreage reduction programs. Both views ignore the political realities that when any kind of tightening up of the programs is offered (such as cross compliance, restrictions on summer fallow, or mandatory controls on haying and grazing) the Congress will rush to try to stop it from happening.

While cross compliance may provide limited value for certain commodities or regions of the country, there are also costs. Cross compliance could be particularly detrimental to participation in commodity specific programs. For example, a producer with a large wheat base and a small corn base may only want to participate in the feed grains program. However, under cross compliance he may very well not participate at all rather than being forced to participate in both commodity programs. Moreover, if cross compliance was administered as it has been in the past, it would be structured to control the total acreage in production, not individual crop acreages, by establishing a normal crop acreage for each producer. Thus, there is no assurance that less wheat, corn, or another commodity will be produced on farms that are participating in the programs.

In view of the ineffectiveness of limited acreage reduction programs in the past, perhaps we should go a step further to determine whether or not acreage reduction programs, in general, are in the best long term interest of agriculture.

A quick look back into history might add a little perspective to this. In 1930, we harvested 1.1 million acres each of two different crops, peanuts and soybeans. We all know the peanut story--rigid production controls, artificially high prices and little regard for world markets. Soybeans took the other road--no production controls, minimal price supports and total exposure to world market conditions. By 1980, the U.S. was harvesting about 1.4 million acres of peanuts,

up only slightly from 1930, and about 68 million acres of soybeans. The farmer's value of production for peanuts was about \$500 million while the value of soybean production was about \$13.5 billion. While there are differences between these two industries, I think there is still a lesson to be learned here.

Another good example of the long-term effect of reducing supply and increasing price was pointed out by my good friend Don Paarlberg in a speech he made last summer. In 1930, the U.S. was producing more than 14 million bales of cotton per year. This amounted to more than half of the total world production. After 50 years of following down the acreage reduction path, in 1983, the U.S. will produce about 7.5 million bales, almost 50 percent less than we did when the cotton program started. Meanwhile, foreign production of cotton has increased to 58 million bales, more than seven times as much as the U.S. In the short term the cotton program has increased income to producers but in the longer term it is crippling the industry.

Tobacco is another example. Over the past 20 years, U.S. tobacco production has declined about 10 percent while world production has nearly doubled. Meanwhile, our share of world tobacco trade has dropped about 50 percent due to our escalating support prices that have made us less competitive in world markets. It's not hard to see what guaranteed price supports and controlled production did for tobacco. Do we want to consign other major commodities to the same fate? Are we already there, to a certain extent, for wheat? What about for rice?

Commodity Loans. For some time now we have advocated that the levels of our current loan rates and target prices are not in the best long-term interest of agriculture since they are so out of line with market realities. We at USDA have used what little discretionary authority we have and lowered loan rates for wheat, and have proposed and fought for a freeze in target prices for wheat, feedgrains, rice, and cotton. Lower loan rates and target prices would reduce the incentives for major U.S. competitors to expand agricultural production.

The loan rate provides a price floor that other countries can depend on. Moreover, unrealistically high target prices provide such budget exposure that our competitors know that we will be forced into acreage reduction programs to raise prices above the loan rate. Thus, the price we more or less generate for foreign producers is even higher yet.

Lowering loan rates for wheat, for example, is a temporary measure under existing authority to help expand demand by getting prices more in line with market-clearing levels. But do we need to go further than this? It seems to me that loan rates must be flexible and they must reflect market conditions; otherwise they distort market signals. We think our experience with loan rates for soybeans, based on a moving average as provided for in the 1981 Farm Bill, is instructive. Such a mechanism, if the rate is set at an appropriate percentage of past market prices, would reduce farmers' risk while not seriously interfering with the signals that the market must send. Export demand for soybeans has remained strong, even in the face of a stronger dollar, in contrast to the demand for some other major commodities such as wheat and rice.

It is my view that loan rates cannot and should not be above market clearing levels. And, loan rates should be set at a level that will not shelter inefficient producers. Furthermore, the level of loan rates should not be carved in stone in legislation. We have just seen the shortcomings of such policy actions. However, I do believe there is a need for loan rates with regard to providing some price protection for our farmers. However, it is imperative that the make-up or formula for determining the level of loan rates reflect domestic and international changes in agriculture and the economy, and not be subject to political or other forces.

Farmer-Owned Reserve. There are ways of enhancing income that are sound in the long run. And, in my view, there are ways that aren't sound, too. Specifically, I don't think that the farmer-owned-reserve should be used as an

end in itself to enhance prices. I know that once in a while prices can rally, in spite of record supplies, simply because most of the surplus is locked up in the reserve and not available to the market. However, when farmers produce for a reserve and the production is locked up, it hangs over the market and depresses prices for years to come. Other countries smile as we demonstrate we are ready and willing to bear all of the costs of smoothing out the grain markets and reducing their producers' risks, so they plant more.

What is the appropriate role of the reserve and for what crops? Can or should it really be used to enhance income over the long run? Does a reserve contribute to economic efficiency by reducing market extremes? Do we really need a government-sponsored reserve that is open-ended? If it is not open-ended, then how much is enough?

As one can see from the questions asked, more information is needed about the appropriate size of the reserve and the level for the release price, as well as the make-up, stability, and total amount of storage incentives. Finally, we should probably be looking at developing relatively stable, self correcting program rules for the reserve--rules that would be sensitive to underlying trends in the agricultural economy and not to short-run events.

#### New Agenda Items

There will be additional items added to the agenda for the 1985 Farm Bill. These are areas that those in the agricultural community must discuss and, perhaps, even take a stand on, despite the fact that some of them transcend agriculture and involve broader issues.

Foremost among the issues I am referring to are policies for U.S. international trade and U.S. macroeconomics. There are others I could cite, especially soil and water conservation, but I will stick with these first two areas for the purposes of this discussion. Decisions with respect to, or changes in, these



policies are integrally important to domestic farm policy. I believe that you will not be able to achieve a successful domestic farm policy without accommodating policies in these other areas. In other words, they are necessary but not sufficient conditions for an efficient and vibrant agricultural economy.

### Agricultural Trade Policy

It seems that there is more and more interest in developing a more formal agricultural trade policy, one that is consistent with, and highly integrated with, our domestic farm policy. Why is this so? A closer look at the make-up of American agriculture shows just how important our foreign customers are and many are beginning to realize this. On the average, during the last five years, foreign markets purchased 35 percent of our total grain production, 50 percent of cotton, and 41 percent of soybeans. In other words, American farmers have exported the production from an average of 100 million acres of grains, soybeans and cotton per year over the past five years. Agricultural exports also strengthen the economy as a whole since every \$1 billion in agricultural trade creates an additional \$1 billion in U.S. economic activity. Moreover, our agricultural trade reduces our overall trade deficit by about \$20 billion per year.

I think everyone knows that this Administration is committed to expanding and maintaining markets for our farmers. President Reagan has taken steps towards maintaining our markets in the face of adversity. These actions include:

- (1) lifting the Soviet grain embargo and negotiating a new LTA with higher minimums;
- (2) adopting an agricultural trade policy that promises to never have an embargo for short-supply reasons or single agriculture out and use agricultural exports for foreign policy purposes;
- (3) extension of record large export guarantees and support for international organizations designed to help out developing countries caught in a credit/financial crisis; and
- (4) initiating well-defined and targeted actions such as the Egyptian flour sale, designed to regain lost markets due to

export subsidization of other nations. There are others. However, it's no secret that agricultural exports have declined for the third consecutive year. I think some are concerned that if additional actions or initiatives are not taken as a part of a broader and more formalized agricultural trade policy, policies to reduce agricultural output on a permanent basis will be advanced, seriously considered, and perhaps even enacted into law.

While I do not agree with several of them, the following are a list of agricultural trade issues that are being discussed more and more, and perhaps will receive serious consideration by some in the future.

Bilateral Trade Agreements. Some suggest that we should strive for more bilateral trade agreements to insure our share of world markets. Our neighbors, the Canadians, now have about two-thirds of their grain trade under such agreements. It has generally been our position to not promote bilateral agreements in the interest of free trade. However, we should also recognize that some countries insist on such agreements. Perhaps we should, some argue, consider in limited situations bilateral agreements in the context of the realities of the market place, recognizing that excessive use will increase market instability.

Export Subsidies. To further expand our farm markets, we have relentlessly negotiated for freer trade, most notably with the European Community and Japan. While these negotiations have not been entirely successful, there have been some small concessions. Many argue that, however, where our negotiations for freer trade are continuously ignored we should not be opposed to more targeting actions such as the Egyptian wheat flour sale. Others argue that more direct and comprehensive subsidies are needed. However, others feel that the best course for freeing-up world trade is to let our own actions and policy serve as a model; and that this will prove our sincerity and enhance our negotiating position in the future.

More Effective GATT. Still others suggest we must develop an effective forum for settling international trade disputes, and their argument goes like this. The first priority under this item should be to renegotiate the GATT subsidy code with respect to agriculture. Then a thorough review of GATT rules, regulations and procedures should be undertaken in order to determine how to strengthen the overall process and make it more effective. For example, in 1975 a complaint concerning unfair subsidization of wheat flour was submitted for review under the Section 301C process established by the GATT. After eight years of review, no conclusive action on this case has been forthcoming. Thus, there is a belief by many that GATT must be made more effective and responsive if free world trade is ever to be achieved.

Export Credits. Many importing countries currently are confronted with extraordinary debt burdens. The short term liquidity problems in international capital markets severely restrict their ability to import. Many argue that increased authority for the USDA GSM-102 export credit guarantee program will provide commercial banks with the incentive to maintain and increase import financing. They argue that making credit available will permit the import of food into these countries and, in addition, will have a positive effect by bridging the foreign exchange gap, allowing for non-food imports vital to economic recovery. The U.S. trade deficit problem will be aided through larger exports of both food and non-food products and through greater economic growth in importing countries. Given the financial situation that many developing and middle income countries find themselves in, it seems that this will be another issue that will receive much attention in the near future.

Other Issues. There appears to be other agricultural trade issues that several believe are of importance. They include: (1) a review of current international food aid programs concerning their purposes and effectiveness;

(2) increasing our proportion of value-added exports; and (3) developing more effective market development programs.

### Macroeconomic Policy

Now I want to turn to what I believe is the most important new agenda issue-- macroeconomic policy. Macroeconomic developments have had a tremendous impact on the economic conditions of U.S. agriculture. Recently, the U.S. has exported the output from two of every five acres that are planted each year. While we have experienced weakness in export volume during previous periods of weak economic growth, the magnitude of the current decline is unprecedented. Since 1981, our net agricultural trade surplus has declined by over \$8 billion as the volume of exports has dropped nearly 12 percent.

The causes are many, but the increased value of the dollar has had a very significant effect on exports by making our commodities much more expensive in terms of foreign currencies.

Much of the increase in the value of the dollar is directly attributable to our inability to bring the budget deficit under control. As long as financial markets perceive that a crowding out of private investment must eventually occur in order to finance large Federal deficits, there will be an expectation of higher interest rates to ration the available funds. Current long-term interest rates will obviously not drop greatly in this environment and the foreign capital and goods flow will continue into the U.S. and maintain the strong position of the dollar.

It should be recognized that the inherent lag in the spread of the U.S. economic recovery to our most important markets with growth potential (the LDC's and the CPE's) will make the agricultural trade recovery issue a persistent one over the next several years. And the strength of the dollar is likely to persist (even if some softening of interest rates takes place) due to the "safe haven" role that



the dollar is playing in present foreign currency markets. That role will continue as long as a large number of countries are experiencing economic and political stability problems.

While some adjustments in capital flow restrictions in other countries, such as Japan, may provide some near term relief, it is reducing the budget deficit that should receive the highest priority to correct our current trade problems. However, the opportunity to achieve such adjustments in the Congress appears limited, leading some to suggest that a shift in the balance of budget control toward the Executive Branch through line item veto powers or changes in the recision process may be necessary to effectively offset the Congressional perception that the electorate are not willing to accept the tradeoffs necessary to control deficits and inflation.

It is for these reasons I believe that agriculture needs to be more involved with the debates on the deficit. Farmers are affected in too many ways to afford to sit still and not get involved. For instance, with large deficits interest rates are high which increases production costs as well as reduces domestic and international demand. Thus, appropriate monetary and fiscal policies are probably as important as the 1985 Farm Bill itself concerning the long-run health of the agricultural economy.

#### Summary

This is truly a watershed time for farm policy. Policies adopted during the next year or so will no doubt affect agriculture through the turn of the century. In the past three years we have had two bumper crops followed by the worst drought in nearly fifty years. We have also witnessed a worldwide recession that absolutely no one would have predicted three years ago. All of this clearly tells me that farm policy must be flexible in order to survive. It cannot and must not be structured to fit only present conditions--we have all seen how quickly and drastically economic and weather conditions can change the outlook.

In closing, I would like to call on you to help us find the answers to the problems confronting agriculture--to help develop farm policy that is responsive to future changes in agriculture and the domestic and world economies. Agriculture is the largest and most important industry in our nation and it is imperative that we use whatever means possible to ensure it a healthy future. I have outlined many important issues and raised many questions that need answers. This is the challenge before all of us that are involved in agriculture. We need your help.

E. (Kika) de la Garza, Chairman  
Committee on Agriculture  
U. S. House of Representatives



Transcription of remarks made November 2, 1983 - Session 28

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I really appreciate the opportunity to be here. I wish I could have heard the other speakers, Secretary Hardin, Secretary Butz, both of whom I worked with and labored with the problems of agriculture. Unfortunately, I was caught on the floor. We've had a very hectic day in a discussion on whether or not to keep our troops in Lebanon. And I left there just after the vote, to be here with you.

Let me begin by saying that the easiest part of making farm policies this year, and next year in 1985, will be getting agreement on our goals. We all want a farm program that will keep the farmers returns at levels that meet his cause, and leave him a few dollars for profit. We want a program that will allow American crops to move in the world market. We want a farm program that gives consumers assurance of an adequate supply at reasonable prices. And, we all want a program that will operate at the least possible cost to the tax payers. I'm sure that Secretary Hardin and Secretary Butz, will agree

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with me on these goals. I'm also sure that Deputy Secretary Lyng and Assistant Secretary Lesher, feel the same way. I suppose you could call every farm leader in the country into a meeting and you wouldn't get a disagreement. But, you know as I do, that we have sharp controversy over some farm programs among important groups in agriculture and agri-business. And that controversy is likely to continue as we prepare to develop the next farm bill in 1984 and 1985. The lesson, of course, is that we can all agree that we ought to go to heaven. And yet, good and reasonable people, can disagree on how we ought to get there. And that's going to be one of our major problems.

Maybe this is not a very profound statement, but I want to tell you that it is very important. We are going to have disagreements as we work on farm problems, but I hope very much that we can deal with disagreements among people who basically want to reach the same goals for agriculture, consumers, and the National economy. If we work in that spirit, we can come out at the end with a product that American agriculture and general public can live with. If not -- it will not totally satisfy anyone of the many groups involved in agriculture, but it can be a program which give farmers the basic protection they need, and deserve, and what is equally important, it may be a program which can get enough support to be



anything. And with a controversial issue such as farm programs, it's one hell-of-a job. And, many times I go home late at night, not knowing whether to kick the dog or kiss my wife when I get there, because of the frustrations of the day. Then, beyond that, we have worried about what USEA says. We have to worry about what side of the bed Dr. Lesher got out of that morning. We have to worry about what OMB is telling Dr. Lesher he can or cannot say, or do. We have to worry about the White House. And I don't want this to sound political at all, because it's not intended to, but the intricacies of the PIK program -- the problem with the PIK is that it had agriculture -- had the Agriculture Department been allowed to work and plan and do all of the necessary preparations for it, it might have been more of a success than they are declaring it to be. But the fact is, that it was announced by the President at the Farm Bureau meeting in Dallas, and when none of us were prepared to go forward, and we have to play catchup after that. And that is a problem.

So, the history of farm legislation is really clear that no program is likely to clear all the hurdles unless everyone in the process is willing to compromise. And is going to help make the process work, before everyone involved is going to have to accept the fact

written into Law. This is very important for us. As you know, the last farm bill passed by only 2 votes, which meant that one could have turned it around. We would have had a tie and the bill wouldn't have passed. I got the two votes that gave me the margin, and I'll tell you why I got them and how I got them.

We were behind, and the well of the House is the area right in front of the Speaker, and the members were coming in late, and one youngman came and switched from no to yea, and this gave us a 202. And a young member from California -- I walked up to him. I embraced him. I did near kiss him on the floor, but I thanked him, and then human nature, I asked him, "How come you gave me your vote?" He said, "Well, I don't know about your dang program. I don't know if it's good or not. I gave you the vote because I just hate to see a grown man cry." And that's what passed the '81 farm bill, my friends.

So, I think that you have to realize what we're dealing with. I like to say that it is the art of the possible. The art of the possible, because in the average sub-committee, there's eight members. The art of the possible for us in the full committee of 41, is 21 members. The art of the possible for us on the floor of the House, with 435, is 218 -- and if you just mill around during coffee break here, see if you can get 218 to agree on

that other players in the game are also working in good faith and for the benefit of farmers in our jcountry. And this is very difficult because, unlike some of the other more controversial programs, where you have dissident groups, or the environmentalists may not agree with some of the chemical manufacturers, for example -- this is human nature. This is understandable. But, when farmers disagree with other farmers, then it makes it doubly difficult. And it is going to be very hard.

Therefore, we plan to go into the next farm legislation, early in 1984 -- early in 1984 and it does not end until 1985. So, I want the world and everyone to be on notice, and not come -- that we were not advised, that we didn't know. We are going to begin early in 1984, hopefully to conclude a reasonable compromise during 1984. I don't want to get caught doing it in 1985, at the end as the time is running out, as we were doing in '81. This is not fair to the administration that has to administer it. This is not fair to the farmer. This is not fair to all who supply the supplies to the farmers, to the chemical, to the tractor dealer, to anyone. You have to plan. And, recently one of the members of our committee mentioned that -- have they announced a program for wheat? And the farmer said, "No, I'm sure they haven't." He says, "How do you know?" He says, "I haven't planted my crop yet."

That's why I hope we can work in '84, and clear the legislation in '84. If not, in early '85, so that we can have it in place and we are able to work. So that we will have ample preparation for the farmer and all of the agri-businesses.

Other issues that we will be busy with -- one top priority item which is facing us today, is the question of dairy programs. And I was advised today, that we will go on the floor Monday afternoon for general debate on that legislation, with consideration of several proposed amendments on Wednesday. And, hopefully we will have something out of the House by Wednesday, so that we can go into conference with the Senate, not only on dairy but on several other items that came in the package. And this is very important, because the costs of the program have been too heavy -- the program that we now have in place -- without pointing any fingers -- anyone who is not working, the surplus is continuing, and we have been for many months trying to get a consensus on this legislation. We think we have it, and we must address the issue. Of course, there are differences. There are people who -- everyone feels satisfied that his plan is the best plan. And I have to be concerned with what plan will get 218, and clear the hurdles of OMB, and USDA, and a possible veto, because I see no way that farm



legislation can override a veto. There's just no way that we can get a 2/3s agreement on any major farm legislation. We have to work again within the art of the possible, And this is one of the areas, we have to reduce the cost to the government. We cannot continue with this tremendous 200-plus billion dollar deficit. I know that we all agree on that, that in the long run possibly, this is one of the major factors that we have to contend with, for many reasons, but principally for the farmer, because they bring the impacts on the farmer most. Really, here talking about farm programs, is the cost of money to operate, and it's the interest rate that impacts on the farmer in the producing end. It impacts on the processor. It impacts on the wholesaler. It impacts on our foreign trade. This is one of the paradoxes. It's one of the dangest things I've ever been involved with. We were -- I don't know about my time here -- but I'll try to hurry.

We were in West Germany, talking to Willie Brandt, when he was the Prime Minister, and we had a colleague from our Congress who was very friendly. They had known each other as NATO parliamentarians. And Willie Brandt say, "You've got to get your house in order. You've got to bring inflation down. You've got to bring your interest rates down. You've got to reduce your deficit. I can't be propping up your dollar everytime it get in

trouble in Europe." Okay, we said, we'd try. Next time we see Willie Brandt -- not in that position any more, but friendly to us, and we have a meeting with him. He says, "What are you doing to me with your strong dollar? You're killing us. You're costing us trade. You're costing us money. What in the world are you doing to us?" We said, we're doing what you told us we should do to begin with. But that's just one of the paradoxes, that here we were -- the year of the highest export this century for us, the highest income in export this century for us, the lowest income this century for the farmer. It just flat didn't make sense. But, part of it was because of the intricacies of monetary policy and the farmer. He doesn't know about monetary policy. He was put by the Good Lord on this earth to grow food for the people, and that's what he knows, so we have to contend within the areas that we deal with, to compensate for world policy, for regional policy and for domestic policy and for everything that impacts on what that farmer is going to do.

But, let me tell you, and make no mistake about it. The importance of that one farmer -- Deputy Secretary Lyng mentioned that I was in the Navy. I was in the Navy towards the end of World War II. I never got aboard ship. As soon as I joined the Navy, everyone quit. The war ended, and that was the end of that. I kept bugging

people. I want to go to sea. I want to go to sea. I want to get aboard a ship. No way. A lowly seaman, second class. Finally I ran across a very old Chief Boatswain's mate. I said, why don't I get to go to sea? I felt that they were discriminating for some reason. He said, you tested too high. I said, what are you talking about. He says, your IQ is too high. I says, heck, I could have taken care of that. I can test low, if necessary. But I didn't get aboard ship. So, when I came to Congress, here were the liaison for the Air Force, and the Navy and the Army. What can we do for you? So, I tell the liaison from the Navy. I want to go on board a carrier. Boom! There I go, off to Florida to get on a carrier. Then I want to get on a cruiser. There I go to get on a cruiser. Then finally, I say, I think they're just about ripe for me. I want to go on a submarine. Oh, I don't know about that. Well, finally I have to take a physical, and they check me out, and good ears and all of that, and they let me go on a submarine. One of the nuclear subs. We went off and they let me -- they call it flying it -- and they let me fly it. It's just like a plane, you push down and it goes down, and you pull back and it goes up, right, left, right, right. There I was under the Atlantic flying that thing all over the place. You might have noticed that there was a time of

the year when a lot of whales beached themselves -- well, that was me. Before we got off the ship, that sub, I asked the Commander -- very young -- by the way the average age of an officer of a submariner or men, was  $19\frac{1}{2}$  years of age. Those are the people that run our subs. But, I asked him, how long can you stay? A profound question. How long can you stay under water. He says, that's a military secret, Congressman. So, I said, well, I don't want to mess with military secrets. So, he said, I'll give you a guess. So, I says, well, I'm thinking of the core, the reactor. I'm thinking eight years, ten years. Well, I says, short -- six, long ten -- so, I says, eight years you can stay under water. He says, no, no. You're chairman of the Agriculture Committee, aren't you? I says, "yes. He says, I'll give you another guess. I said, no, I give up. So, here's a military secret he said. I can stay under water as long as I have food for my crew. So, it's the farmer that is running all the dang Navy. And, the Army. And, the Air Force. And if you call this plant of our a ship, and the vastness of the oceans and the sky, it's the farmers who are running this planet and keeping it alive. And that's why we have to dedicate ourselves -- sure, we have differences. We'll always have differences. This is human nature. But, this was so forcefully put to me, that all of that technology, all of



the nuclear reactor, all that went to make this powerful vehicle, either for peace or distruction, went back to some little farmer in Iowa or Texas, or some place in the United States, providing the food for that crew. And this is something that we can't, and should not forget as we deal with programs in agriculture.

Finally, let me just say that regardless -- I know many of you are frustrated and you get frustrated everyday. We get frustrated. Oh, we have the exchanges with the administration, with OMB, within our committee, we parbably are the least partison committee, because the problem of farmers is the problem of a farmer. It has no Democrat or Republican tag to it, and we work that way in our committee, but sometimes we get frustrated, and you get frustrated at the system. So, for those of us, our citizens and our foreign guests, I would explain -- don't get frustrated with the system because it is working, and it is working well. The nuts and bolts, the tools that we have to work with -- that we can handle. But, within the system, you have to have a working majority at one given point in time in the Congress, and out in the countryside, we elect or unelect Presidents. We elect or unelect members of the Senate, to the House, Mayors, Councilmen, County Supervisors, but all within the system. And the pendulum goes right and left, and

roller coaster goes up and down, but all the time the system is generating survivability -- if that's the word -- of the independence of the individual. We are by far, the freest of any nation in the world. We are by far the best fed -- the best quality food, in the world, possibly in the history of the world, for the lowest amount of disposable income per family, basically in the world, in the history of the world.

More often than not, that food is placed on that table by that farmer, for less than it costs to produce it. So, I agree with going to the marketplace, but in the reality in the art of the possible, it just flat doesn't work, because the system has gotten out of kilter. Government imposes costs on the farmer that are not compensated for in the marketplace with perishable commodities or commodities not of long survival. They tell him how much he has to pay -- not that we begrudge that, because goodness knows farm workers make little and should make more, but government tells him how much he has to pay -- whether he sells the product or not, whether he sells for a profit or not, the government tells him what kind of housing he must have for his people, they tell him what kind of pesticide or insecticide he can or cannot use, it may be a low price, it may be a high price. The market doesn't compensate, so within the vacuum of philosophy,

yes, you can talk about free markets. In the reality of the world and Main Street, U.S.A., and out in the farm rows and corners of our countryside, the farmer can't rely on that free market, because he has a fixed cost which government has imposed on him. And that's why he has to instinctively produce, produce, produce. That's one of the problems that we'll find with the milk legislation -- that, oh, yeah, we can cut them one dollar, one dollar fifty, two dollars -- you know what the farmer is going to do. He is just going to feed the hell out of them and get more milk to compensate for that money he lost. That's what he is going to do. That is one of the intricacies that we have to deal with.

But the thing is, are we going to make the decision in '84 or '85? This probably, and I agree with Dr. Lesher, he intimated at it -- this probably will be it for this century. The road we take in the '85 Farm Act, will be for the end of this decade and into the end of this century. And we have to compensate for unseen forces of man and nature, that impact on that individual farmer on the 20 acre plot or the 300 acre plot or the 3,000 acre plot, and whether you are a major conglomerate or whether you are a family corporation, or whether you're just one lonely farmer fighting your way out -- trying to make a living for yourself and your family -- all of these forces

of man and nature, are going to impact. And we owe him some degree of moral responsibility as a country, collectively, for his contribution to give us a good, ample supply of food, and enough to send to other parts of the world in trade or in charity, when needed. We collectively owe him some degree of assurance that he is going to get, at least -- at least, what it cost him to produce it, without having to pray and kneel everyday, that the market will justify that investment that he made on that crop, because that market can't and won't do it, because it does not compensate for that fixed cost that government has imposed on him.

So, I leave these thoughts with you, as you hopefully will work with us. I think they may have said it, if not I'll say it for them, because they will not disagree. This is your Department of Agriculture. This is your Secretary of Agriculture. We are your agriculture committee in the House of Representatives. I am your Chairman. We are one, together, collectively, in unison, and for that reason, we need to work as one, settling the differences, arguing the compromises, and eventually arriving at the art of the possible, which would be in -- what a simple thing to ask -- that a farmer get, as his return, what it cost him to produce it and just a little bit more, to keep him being a farmer for the rest of this



century. That, my dear friends, is what we face and what collectively, and hopefully -- with the help of the Good Lord, and yours, we will be able to achieve in 1985.

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John F. Marten, Staff Economist, Farm Journal

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My Personal Biases should be of immediate concern to you. It's always comfortable if audiences can "label" or otherwise categorize speakers. Prepare to be uncomfortable. I represent no university, farm organization, government agency, or commodity group. I don't officially represent Farm Journal--at least not as concerns the views expressed today.

What I do represent is one voice among many, with--hopefully--the requisite credentials to comment on the shape of U.S. farm programs in 1985 and beyond. My biases are those of a market oriented economist who is also a moderately leveraged farm owner. So farm programs which raise or lower crop prices by 10% are a serious subject to me.

My introduction in order, let's proceed to the issues at hand, with the thought that political reality is our companion.

Learning From History means at least two things today. First, really new proposals are rare! And second, a brief look back is needed to locate our starting point. Our first question: Are we really in need of a new direction in farm policy? Three other alternatives could be that: (a) we need to fine-tune the tools being used; or (b) we need different decisions by the people operating the tools; or (c) the recent disaster which gave birth to PIK is the result of temporary factors. It wouldn't surprise me if thinking folks concluded that each of the four positions has some merit.

#### Our Pre-PIK Situation

It's fair to ask just how we managed to re-accumulate a 1961 size, or larger, surplus of crops in just 2 crop years--1981 and 82. Carryover totals for corn and wheat combined jumped from 2 billion bushels to almost 5 billion--up 250%! Put differently, we grew 8.3 billion bushels and used 7.1 billion bushels of corn annually. Quite a feat!

How'd we manage it? Here are the 4 key ingredients.

1) A restrictive monetary policy shift which helped produce: lower inflation, higher nominal and real interest rates, a severe

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recession here and overseas, a stronger dollar, and weaker demand for U.S. crop exports.

2) A very expansionary fiscal policy of tax cuts coupled with increases in government spending--especially on defense. The resulting deficits must, obviously, be financed. As funds flow in to do this, the dollar firms and exports get still weaker. Odd as it sounds, our current monetary and fiscal policy are working against each other, rather than in concert as would seem logical.

3) Relatively favorable weather contributed its' share to the surplus--yields averaged about 5% higher than trend for 1981 and 82. But, as you now know, 1983 made up for these earlier good yield years.

4) Congress, O.M.B. and U.S.D.A. combined to send producers and users alike, the wrong signals in 1982. They used the reserve mechanism as an income support tool. The trigger level (at least for corn) became the market clearing level. Only the low final compliance levels for the 1982 programs kept crop prices from zooming to "sub trigger levels" immediately. The reserve became "the market"! In a nutshell, we moved away from a market orientation. I doubt if we meant to, but we did!

Clearly, all the wrong levers were pulled in the spring of 1982 as we warned in Farm Journal at that time. In addition to spawning another return to the PIK mechanism first used in the 30's and 60's, it should serve all current and future farm policy students with a classic study model of "how not to do it"!

But wait, the 1982 "silliness virus" was still alive in September in Washington. The situation was as follows: too much grain supply, too few buyers wanting it. With an election looming--Congress devised a remarkable plan--they raised the loan rates by 10¢ for both corn and wheat! How clever! What businessman raises prices to move excess inventory? Worse yet, how do you reduce production by raising guaranteed producer prices? You don't--of course.

The signal sent round the world was "the rest of you folks can have the market, gear up and go for it!" So, if you'll allow me to reword the legislation, Congress really passed the "Canadian Agricultural Development Act of 1982" when it voted the higher loan rates!

With this perspective, I watched the administrations 1983 program choices with interest, knowing that "He who rides a tiger should have plans for dismounting".

#### PIK to the Rescue!

Necessity is the mother of invention sayeth the philosophers. PIK makes me a believer.

While fastened firmly in the tiger's saddle, I could visualize Secretary Block studying his "wish" list. To be a perfect solution, he needed a program which would:

- 1) cut production;
- 2) increase prices and farm income;
- 3) get grain back out of reserves and on the market;
- 4) cut government storage, interest and deficiency payment costs;
- 5) appeal to almost every farmer;
- 6) buy time while we all figured out what to do next.

PIK was reborn. It answered all 6 of the above "prayers". In my opinion, it was a brilliant--almost perfect--solution. Warts and all, PIK was--and is--a dynamite farm policy idea. Armed with it, our "tiger pilot" dismounted and walked into the dawn of 1983.

A reversal in policy? You bet. We went from "let's build the reserves" to "let's drain the reserves"; from "grow grain with guarantees" to "take our grain and the market price"; from philosophical opposition to paid diversions, to the biggest paid diversion in history.

#### PIK in Future Programs

Some argue that PIK was a riverboat gamble, too expensive, etc. One wonders if it is destined to be thrown on the scrap heap of farm policy boondoggles and left to die. To discard PIK from future program use would be a grave error in my judgement.

Including PIK as a key tool in future programs could work like this:

1) Distribution of "kind" instead of cash when supply reduction was warranted--saving C.C.C. storage, interest and spoilage.

2) PIK would "kick in" when stocks (C.C.C. plus reserves) accumulated above a pre-set level.

3) PIK would automatically end when excess stocks were worked off--you can't give away what you don't have.

4) C.C.C. stocks would rise, then fall, as they were recycled back on the market--either via domestic or export PIK programs.

5) Congress, Farmers and U.S.D.A. could quit arguing over and legislating C.C.C. resale prices--we wouldn't need them since no C.C.C. sales would ever need to be made--an amazing side effect of PIK as a policy tool.

6) Similarly, the paid (in cash) diversion tool could be scrapped--the only cash needed would be for regular loan distributions in cases where farmers had to grow their own PIK.



In summary, PIK is a marvelous farm program mechanism. Used correctly, it would kick in when needed--and only then--and it stops, by definition, when its' work is done. PIK is so simple. But many still don't understand its' beauty. A fellow farm economist remarked to me this summer: "John, PIK isn't good farm policy, it won't work when the reserves are gone!" Hmm. (Those same old philosophers talk about seeing trees instead of the forest!)

### What is the Program Environment?

A major cause of our recent low price / high stocks debacle was the failure to build a policy package which was flexible enough. But further problems resulted due to poor estimation of economic, political and weather conditions.

For the late 80's, I'm assuming that:

- a) Yields will continue their upward trends, reaching 120 bu. corn, 40 bu. wheat, 34 bu. soybeans, etc by 1990. Yield plateaus occur only in our minds!
- b) Sunspot cycles will persist, giving relatively good weather throughout the 80's--then returning in the mid-90's to a periodic drouth cycle. I figure 1983 was a fluke.
- c) Farm enlargement will continue; leaving fewer, larger farmers.
- d) Food as a weapon will continue as a defense consideration, in control of the State Department--not U.S.D.A.
- e) Monetary and fiscal policy will remain somewhat unstable--though hopefully less bothersome than in the 1980-83 period.
- f) Production will increase in competitive countries, especially if we support higher prices in today's world market--our price umbrella is a big one!

### Do We Need New Programs?

Those who favor a complete revolution in farm policy argue that the old crop commodity programs just won't work in an unstable economic climate; that both producers and users get all the wrong signals; that government costs are too high; etc. They say: throw out the bad ideas and start over. They have a point.

What I'll term the "revisionists" take a different approach. Basically, they believe that: the available tools will work if made more flexible; that the problem has been one of using the wrong tools for the wrong purpose; and that no policy kit would have worked very well in the recent economic climate.

Ultimately, we'd all prefer a set of programs that are revolutionary--where revolutionary means they work!

## What Are We Trying to Do?

Having already baptized PIK as a program "winner", I've perhaps placed the cart before the horse. But then, I had a pretty good idea that the horse would show up.

Our future programs might attempt to accomplish the following tasks:

- 1) Assure an adequate supply of food and fiber at reasonable prices to consumers.
- 2) Be fair to farm producers--including the notion of making a profit.
- 3) Recognize federal budget deficit realities--efficiency can save billions--PIK did.
- 4) Enhance our competitive position in world markets--increased trade means more jobs, economic growth, and higher incomes for U.S. farmers and consumers.
- 5) Encourage soil conservation on all land at all times--the 1981 Act coupled with excessive disaster relief sends the wrong message!
- 6) Make provision for retraining, family living allowance, etc. for what economists refer to as "excess resources shifting out of agriculture"--these are people, not numbers. Just a \$1 billion budget item would refit 50,000 farmers at a cost of \$20,000 each.
- 7) Provide a voluntary income or price safety net which doesn't interfere with the market mechanism--target prices were designed for this task.
- 8) Reduce the possibility of having the inflexible loan rate problems of the early 80's by going to a program of flexible loan rates for all commodities--or in other words, give U.S. farmers a chance to compete!
- 9) Promote exports and free trade.

This list could go on and on. In summary, our programs will be most effective if they work in unison with nature and market realities and are flexible! A farm policy which needs re-doing every time there's a big crop or a small crop, or a shift in the economic climate isn't a policy, it's a mess!

## Target Prices--An Abused Tool!

Apparently, imaginary farmers in Washington, academia, etc. can produce commodities and get the target price level for them. If you're caught up in this fantasy, please listen to how it really works. The following statements are accurate:

1) Target prices have little if any direct impact on the real market price. Cash corn in Iowa paid absolutely no attention to the \$2.70 target price last fall--it went to \$1.70.

So, target prices pass the first test of a market oriented program, they don't interfere in any significant way with the market clearing or rationing process involved in "price discovery".

2) Target prices are thus an outstanding income transfer tool. They relate to bushels, pounds, acres, costs and prices in an almost ideal way.

3) There is no such thing as an "unpaid setaside" (A.R.P.) in the real world. No farmer idles productive land without payment. Deficiency payments constitute a major portion of the "potential" payment farmers budget for idling land.

4) Target prices are not paid on what you produce. Actual deficiency payments are the same whether your wheat makes 5 bu/acre or 50! So, contrary to what some thing, there is no way to add fertilizer to produce for target prices.

5) Target prices bear little relationship to the prices you receive in most cases. Deficiency payments are based on national average prices and loan rates.

6) Only in rare circumstances (when there is no unpaid setaside required) has any farmer received deficiency payments without experiencing an offsetting cost. Clearly, U.S.D.A. calculates the potential deficiency payment amount per acre idled when setting up the programs. It costs money to idle land--farmers don't do it to be patriotic.

7) In practice, target prices--really the resulting deficiency payments--have taken the place of paid diversion. Farmers aren't getting the income transfer originally intended.

Summary: To me, being politically realistic and market oriented means keeping the target price "sandpile" for the "we must help farmers now" cats to play in! Otherwise, we'll gravitate toward ever higher loan and reserve rates.

I'm sure the Canadians and Argentinians are watching us carefully in hopes we'll discard target prices and go with the high loan rate option. They've already expanded production in response to the massive umbrella we've raised on their behalf. Imagine the joy of a wheat producer in Saskatchewan. His dollar is now just 80% of ours; so effectively, his price umbrella has been raised from \$3.00 to \$4.50 since 1980. If he's lucky we'll continue stumbling into protectionism, trade wars, ever high loan rates, etc. We'll store wheat and idle land, while our Canadian friend grows wheat and sells it!

### Whither Loan Rates?

Unlike target prices, loan rates aren't designed to be an income transfer device. So the political process need not determine the level--the market can do the job just fine! To be efficient, loan rates should be:

1) Flexible enough to adjust up and down as market signals dictate. This means looking at soybeans and cotton for guidance. Congress could easily write a law that set loan rates automatically at 90% of the average market price for the first half, or first five months, of the last three marketing years.

2) A source of financing to farmers to smooth out marketings and stabilize prices--at least to some degree.

3) Beyond the control of the Secretary of Agriculture, Congress or O.M.B. Our past 2 year experience demonstrates that the short run "fix" of reduced budget outlays for paid diversions and export promotion can cause billions to be wasted later and interfere with the market clearing mechanism. It happened. This still leaves plenty of options, while preventing a repeat of this year when our response to huge surpluses was to raise the loan rate!

Summary: That's it. Just pass legislation that precludes the U.S. from being in a position of the non-competitive outsider looking in! We'd guarantee that:

- 1) Users would get the "correct" signal.
- 2) Other producing nations (and U.S. farmers) would get the correct signal.
- 3) If we were the lowest costs producers, we would (eventually):
  - a) dominate the market;
  - b) run our agriculture at full throttle, and thus
  - c) stimulate economic growth through trade.

### Are Reserves Worth Having?

Having fully established myself in the "revisionist" camp, let's consider the existing reserve framework. Cynics tell me that we've always had reserves, but we used to call them surpluses. They're opposed on the grounds that they overhang the market, that they inevitably become politicized, and that they are very expensive.

Support for the concept comes from those who:

- 1) View reserves as a price stabilizing mechanism--collecting grain in low priced times and releasing it when supplies are short.
- 2) Think reserves are a valuable policy tool, if used correctly, to temporarily reduce or delay income transfer payments to the farm sector.
- 3) Worry about protecting consumers (and livestock producers) against "wild" and unstable commodity price fluctuations.
- 4) Think we need solid inventory levels to promote confidence in the U.S. as a reliable supplier of farm products.



As with the target price concept, the "sanctity" of the grain reserve concept has taken a terrific battering when placed in use. Like other farmers, I've been astonished at how easily reserve contracts could be "changed". Changing rollover rules, using reserves for PIK, selling reserves (as bonus bushels) just months after agreeing to a 3 year contract, etc. Farmers, as you would expect, have lost some of their zest for reserves because the rules keep changing.

To stimulate thought, consider the possibility that Congress passed reserve provisions in 1981 that were precisely backwards. They allowed "caps", but only above 700 million bushels of wheat and 1 billion bushels of corn. Had they reversed this rule, it would have been impossible to accumulate 3 billion bushel "reserves" of corn and sorghum.

If we keep the reserve concept after 1985, we should consider the following guidelines:

- 1) A specific cap level by crop which approximates a "comfortable" level of buffer stocks--unlike Joseph in the Bible, I doubt we need a 7 year supply! Up to 20% of recent usage levels would be reasonable.
- 2) No direct entry--to prevent abuse as an income support mechanism--target prices do that job very well.
- 3) No (or low) premiums for entry--they aren't needed to entice storage.
- 4) Storage payments at commercial rates, adjusted annually.
- 5) Release or trigger levels set at 150% of the current loan rate without regard to what year the reserve was entered.
- 6) Legal sanctity of the reserve contract--except where PIK needs or quality deterioration intervened.

Summary: On paper, the reserve notion sounds like a useful tool--it certainly could be, and has been. Legislated tightly to insure it's used only as intended, I'd guess broad support would materialize. At present it looks pitiful--just like any cross-cut saw that has been used to pound nails. My point: It can be re-sharpened and will still cut wood in the hands of a good carpenter.

#### Do Payment Limits Work?

Family farms, we are sometimes told, should have their income supported to maintain the structure of agriculture, keep out the corporate and foreign "bad guys" and promote what's right in America. Annually, we wring our hands and organize studies to locate the "bad guys" and stop them from profiting from federal largesse. Results: As of yet, no way has been found to subsidize inefficient farmers to prosperity, nor efficient farmers into bankruptcy. But the search will go on! Our society believes it should.

Payment limitations (now \$50,000. if it's cash) were born from this social goal of protecting structure. Further, Congress desired political avoidance of appearing to subsidize rich land owners. Understandable. But, reality wins out when "people rules" conflict with "economic rules". Payments limits just force bigger producers to produce. Taken to the extreme, we could end up with all big farms producing and all small ones clipping setaside. Oddly, Congress may be accelerating the trend they are trying to stop! If the goal is to idle land, everyone should get with it! Not just the smaller farmers.

### Relate Target Prices to Costs?

Cost curves, economies of scale, etc. are interesting only to economists, apparently. We know that they are downward sloping and to the right with respect to volume; that it's cheaper to produce the 500th acre of grain than the 50th; that about 20% of the farmers grow 80% of the crop--and make all of the net farm income; and, that the profits achieved at the margin from an efficient volume generate the cash to buy still more land.

Why has farm policy never recognized this? Fixed target price levels promote the "less farms" trend. Which is fine, if that's the objective. But it also pushes up land prices and cash rents. Working with averages is particularly dangerous. Missouri Economist, J. Bruce Bullock pointed out in a paper delivered to a National Agriculture Policy Symposium in Kansas City (March 28, 1983) that, "The average farmer lost money in 1981. But on the other hand, the average unit of product was produced at a profit." Bravo! The cost curve does slope downward in a relevant range!

The next step is to get this practical fact into the policy apparatus. Target prices could serve as an appropriate vehicle. Why not shape target prices like the cost curve? As output rises, target prices would decline. For example: the corn target price might be \$3.00 for the first 200 acres or 20,000 bushels, and then decline by 10¢/bushel for each added 100 acres.

Some of the consequences of adopting this "volume adjusted target prices" concept might be:

- 1) Congress could do away with the \$50,000. payment limitation.
- 2) Affected larger farmers might;
  - a) Complain loudly,
  - b) Come to understand the concept over time,
  - c) Scurry to adjust business organization to regain higher benefit levels if loopholes existed,
  - d) Be less competitive in bidding for land.
  - e) Cash rent some of their land to a smaller operator who qualified for higher levels of income transfer.
- 3) Government outflows would decline--perhaps substantially.

- 4) Social goals as concern the "family farm" would be met more closely.
- 5) Land prices would be less likely to ratchet higher as a result of income transfers.

It seems clear then, that policy objectives of providing price stability and supporting low farm income must be handled separately. If income supports are pegged at levels which meet the costs of small farmers, then larger farmers are stimulated to over-produce and have excess profits which are bid into land.

From the standpoint of economic efficiency, income support would cost least if it were paid directly to each qualified farmer. But would that policy be politically acceptable? In lieu of direct payments, an excellent "second best" choice is the variable target price system outlined.

Future Program Needs for all basic crops can be met with the programs and policies outlined. The key words are efficient, flexible, market oriented, safety net, competitive, export growth, world market and profitable.

The search for workable, effective programs should start--as I've attempted to point out--with the policy tools we already have. The key is to legislate and then apply the program tools correctly. A pair of pliers doesn't look like much, but in the hands of an ingenious U.S. farmer, it works wonders. We seem to have an urge toward excess in government programs. We misuse, abuse and overuse each and every tool. Then we lament how it "didn't work". In part, this reflects a flight from reality. In part, it's a sensitive effort by honest people to protect the income and asset values of their constituent farmers.

It is my firm belief that U.S. farmers are more willing to take their chances on the "real" market than their legislators realize. So if, in fact, we are at a crossroads in farm policy, this might suggest a new agenda on Capitol Hill. It might include:

- 1) Passing only the basic legislation with guidelines as discussed above.
- 2) Setting target price levels--annually if desired--at whatever levels society deems appropriate; and, restricting the use of unpaid setaside so the benefits get where they were sent!
- 3) Working to reduce trade barriers like the textile import quota levels which impede trade growth with China.
- 4) Funding demand expansion activities for U.S. farm products overseas.

I'm proposing, in essence, that we allow U.S. farmers to compete. Admittedly, this means there is some potential for pain involved. But, in the long run, we have no other choice.



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Farm income estimates measure the combined effect of changing prices, production, sales, and production costs on the farm business. All the major economic, biological, and policy forces bearing on the economic situation of farm operators are reflected in the estimates of farm income. Entering 1983, the farm sector was confronted with large crop and livestock supplies and a demand situation that was not particularly bright. Altogether, the economic environment suggested a 1983 farm income level a tenth below the level attained in 1982. But, the past ten months have brought major revisions in the outlook for prices, production, sales, and production expenses, leading to an income situation that, while improved, may be best described as both volatile and diverse.

Changes in the U.S. economic situation, world economic conditions, farm programs, and drought in major U.S. production regions, especially the Midwest, have been most influential in framing this year's farm income situation. Of the four factors mentioned, the drought and farm programs have had the largest effect on the income and cash flow situation of farmers.

Entering the calendar year, prices received for all major crops had moved only marginally above harvest time levels, reflecting a large supply, relatively weak marketings, and the prospect for large carryout stocks. After announcement of the PIK program in January, however, crop prices slowly began to move higher, gradually reaching a plateau in early Summer. With the onset of dry weather, crop prices once again began to move to a new higher level--some dramatically. These increased prices have been instrumental in lending strength to the outlook for crop receipts. But higher feed prices and reduced forage supplies have also placed pressure on livestock prices and receipts in recent months. After the impacts of the price changes on crop and livestock receipts, the net effect has been positive for totaling receipts. The largest impact of the acreage reduction programs in terms of the farm income accounts this year, however, will still likely be in the form of reduced farm input use. Currently we expect use of the major manufactured inputs--fertilizer, fuel, and pesticides--to decrease from 9 to 14 percent, contributing heavily to the first decline in expenses since 1953.

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Prices received by farmers for all commodities are now expected to average about 2 percent greater than a year earlier, reflecting the changed supply and demand balance. Crop prices will average 6 to 8 percent higher as strong prices for feed grains, soybeans, and cotton overcome lower fruit prices and small increases in food grain, tobacco, and vegetable prices. In 1984, farm prices are currently forecast to average above this year's level as both crop and livestock prices rise. Prices received by crop farmers will likely average above year-earlier levels during the first half of 1984 but lower during the second-half because of anticipated stronger production.

Prices paid by farmers for all items are now expected to rise less than 3 percent in 1983. This small increase reflects the continued slowdown in the inflation rate in the general economy, lower interest rates, and increased competitiveness in many sectors of the farm input supply business brought about by reductions in the use of farm inputs. Prices paid for feed will post the largest increase in 1983, rising more than 8 percent above the low levels of 1982. However, reductions in input prices will be realized for feeder livestock, fertilizers, and fuels. In 1984, prices paid may rise around the rate of inflation. Nonfarm origin input prices will likely rise more than those for farm origin inputs. Seed prices are expected to rise the most from 1983 levels because of the impact of the drought.

#### Prices Received and Paid by Farmers, 1980 - 1983

ITEM	1980	1981	1982	1983F
	<u>percent change from previous year</u>			
PRICES RECEIVED:				
Crops.....	7.8	7.2	-9.7	6 to 8
Livestock.....	-2.0	-0.7	1.4	-2 to -4
ALL COMMODITIES.....	1.5	3.7	-4.3	1 to 3
PRICES PAID:				
Production items.....	10.4	7.2	0.7	1 to 3
Commod. and services, interest,taxes,wages.	12.2	8.7	4.0	2 to 4
Farm origin inputs....	4.4	1.4	-4.1	1 to 3
Nonfarm-origin inputs.	14.2	10.9	5.3	1 to 3
RATIO 1/.....	-9.5	-4.6	-8.0	-1 to 1

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1/ Index of prices received by farmers for all commodities divided by the index of prices paid by farmers for commodities and services, interest, taxes, and wage rates, 1977=100.

Total farm output in 1983 will likely fall about 15 percent as a small increase in livestock output is outweighed by a large drop in crop output. Crop production, which will fall about 27 percent from last year's record high because of drought-reduced yields and acreage cut-backs, will be the smallest since 1974. Assuming average weather patterns, crop output in 1984 may rise significantly from the drought reduced 1983 levels. Even with a small decline in livestock output factored in, total farm output will rise substantially.

These dramatic year-to-year changes in total farm output ensure that both the 1983 and 1984 net income estimates will be greatly influenced by inventory swings, continuing a 10 year pattern of relatively large adjustments in income due to changes in ending stock levels. The inventory adjustment is measured as the value of the change in stocks, thus the direction of change is determined by the direction of change in ending stocks.

The small crop this year ensures a large negative inventory adjustment for 1983. A return to more normal crops next year would add a correspondingly large positive adjustment to net income in 1984. Meanwhile, nominal cash income could be record large this year, reflecting the PIK payments, substantially higher prices, and reduced expenses. This divergence in income measures points to the need to consider not only net income, but also cash income, cash flow, and other related financial measures when drawing conclusions about the farm sector's economic situation. We provide our perspective about each of these measures for both 1983 and 1984 as we move through the remainder of the paper.

#### Cash Receipts

Total cash receipts from marketings of farm products in 1983 are expected to decline 1 to 2 percent from the 1982 level of \$144.6 billion with crop receipts down 2 to 3 percent, to about \$72 billion, and livestock receipts at \$70 billion, about the same as 1982. For livestock, lower prices received will be offset by increased marketings--larger production of pork (+6%) beef (+3%), and broilers (+3%) are the major reasons for the increase in overall marketing volume in 1983. Higher average prices for crops will be more than offset by a reduction in the volume of crops marketed.

In 1984, total cash receipts are expected to increase moderately above the 1983 level of \$142 to \$144 billion, reflecting higher prices on average for both crops and livestock. Livestock receipts could rise somewhat as prices respond to lower marketings and a recovering economy. Receipts for broilers and cattle and calves will likely rise the most next year. Crop cash receipts are expected to recover strongly in 1984 as higher prices during the first half of the year combine with large marketings during the second half.

# Cash Receipts, 1980 - 1983

ITEM	1980	1981	1982	1983F
----- Billion Dollars -----				
Crop receipts 1/.....	72.7	73.1	74.4	70-74
Food grains.....	10.4	11.6	11.5	10-12
Feed grains & hay...	18.3	17.1	18.2	17-19
Oil crops.....	15.5	13.9	13.8	13-15
Other crops.....	28.5	30.5	30.9	28-30
Livestock receipts....	67.8	69.2	70.2	69-71
Meat animals.....	40.9	39.8	41.5	39-41
Poultry and eggs....	9.2	10.0	9.5	9-11
Dairy products.....	16.6	18.1	18.4	18-20
Other livestock.....	1.2	1.3	1.3	1-2
TOTAL CASH RECEIPTS...	140.5	142.3	144.6	142-144

1/ Includes net CCC loans.

In the livestock sector, lower cash receipts from cattle, hogs, and turkeys in 1983 will be offset by higher receipts from broilers, eggs, and milk. Cash receipts for cattle in 1983 will likely be down about 1 percent as a 2 percent reduction in the farm price of cattle more than offsets an increase in marketings. Although general economic conditions have improved real per capita income this year, large total meat supplies will leave the average farm price for cattle at it's lowest level since 1978. Reflecting higher grain prices and this Summer's drought, beef production is expected to fall in 1984. But, this decline will likely be more than offset by increased cattle prices, leaving cattle receipts up modestly.

Hog receipts in 1983 will likely decline about 5 percent as sharply lower prices offset increased pork production. Pork production has increased this year because of the large spring pig crop and has driven average hog prices down nearly \$8 per 100 pounds during 1983. With high feed costs and poor returns this fall and winter, pork production is forecast to decline in 1984. However, this decline will likely be offset by higher prices, resulting in a small increase in 1984 hog cash receipts.

Receipts from broilers will likely post the largest gain of all livestock categories, rising 7 to 9 percent in 1983. This increase, which follows last year's declining receipts, reflects both rising prices and expanded production. Broiler output is expected to be up nearly 3 percent in 1983 despite some death losses caused by hot weather last Summer. In 1984, broiler receipts are again expected to rise measurably as broiler producers continue to expand output and improved demand for chicken helps increase broiler prices.



Milk production has continued to increase in 1983, rising about 2 percent as both dairy cow numbers and output per cow increased. Since the all milk price will likely average about the same as in 1982, the 2 percent increase expected in dairy receipts this year will be due to an increased volume of marketings. The price deductions levied against all milk marketed imposed under the Omnibus Budget Reconciliation Act of 1982 are considered production expenses and, thus, do not affect dairy cash receipts. In 1984, dairy cash receipts are expected to rise fractionally as marketings decline slightly and milk prices (unadjusted for deductions) increase.

Crop cash receipts, more tentative than usual at this time of year because of the impact of PIK entitlements, are expected to fall 2 to 4 percent from the \$74.4 billion of 1982. Large declines are forecast in the receipts for cotton, rice, tobacco, and fruits, but these will be moderated by smaller changes in the receipts for wheat, corn, and soybeans. Farmers who participated heavily in the acreage reduction programs this year may either delay marketings until 1984 or attempt to move expenses into 1983 to lessen taxes this year. These program influences could alter farmers' traditional marketing patterns and influence the estimate of receipts for both 1983 and 1984. Overall, crop receipts could rise substantially in 1984 as strong first half prices and large second half marketings combine to raise receipts measurably. Rice, soybeans, corn and cotton receipts may rise the most next year.

Cash receipts for food grains are expected to decline 1 to 3 percent in 1983 as a 2 to 4 percent increase in wheat receipts is more than offset by a decline in rice receipts of about one-third. Rice receipts are expected to fall because of a sharp decline in expected marketings in the last quarter caused mostly by a 33 percent decline in production. In 1984, wheat receipts could drop substantially as prices fall in the last part of the year because of the expectation of continued large stocks.

Feed grain receipts for 1983 are expected to fall 1 to 2 percent as higher hay and barley receipts are more than offset by lower corn and sorghum receipts. For corn and sorghum, large first-half marketings from the record-large 1982 crop and heavy use of CCC loans will combine with strong second half prices to nearly offset the decline in marketing volume from the small 1983 crop. The marketing volume decline will also be softened by the introduction of PIK corn and sorghum into the marketing channels. Barley receipts are expected to rise 16 to 18 percent as both production and prices rise. Both the corn and sorghum PIK programs and the drought were instrumental in helping raise barley prices during the last half of this year. With first half 1984 prices sharply higher than a year earlier and second half marketing volume also above a year-earlier, receipts for feed grains and hay are expected to be well above the 1983 levels.

Oil crop receipts in 1983 are expected to remain near the \$13.8 billion of 1982, the third consecutive year of nominal receipts near this value. Soybean production fell 32 percent this year, mostly because of a 23 percent drop in average yield per acre. However, soybean receipts will likely not rise much from the 1982 level as first-half marketings from last year's record crop nearly offset low prices, and strong second-half prices should offset reduced



marketings from the short 1983 crop. In 1984, soybean receipts could rise significantly above the expected 1983 level as strong prices offset a reduced marketing volume. Marketings could begin to improve by the final quarter and prices could decline if 1984 production rebounds from this year's low level.

Cotton receipts in 1983 are expected to drop a fifth from the 1982 level of \$4.9 billion. Cotton production fell 37 percent from the 1982 level as the drought reduced average yields 17 percent and the drought and acreage programs cut harvested acreage 24 percent. As a result, marketings will likely be off substantially in the last-half of 1983 while prices rise moderately, leading to reduced receipts. Substantial marketings of PIK cotton during the final quarter could lessen the decline. Also, if the drought impacts the quality of the cotton harvest, new CCC loans during the fourth quarter could be an important factor in 1983 cotton receipts. Despite the short 1983 harvest, cotton supplies will be adequate in 1984 because of large stocks. Receipts will likely recover significantly in 1984 from this year's projected decline.

Tobacco receipts are likely to fall nearly a sixth in 1983 as lower marketings offset slightly higher prices. But in 1984, higher prices and larger production will combine to raise receipts.

Cash receipts for vegetables in 1983 are expected to rise 1 to 3 percent from the \$8.1 billion of 1982. Receipts for potatoes and tomatoes account for about one-third of vegetable receipts and receipts for both are expected to remain about the same as in 1982. Potato production is down 6 percent this year, while dry beans are down 38 percent and sweetpotatoe output is down 22 percent, mostly because of the drought. In 1984, vegetable receipts are expected to rise as both production and prices improve over 1983 levels.

Low first-half prices and reduced second-half production are the main reasons for an expected 9 to 11 percent decline in cash receipts for fruits and nuts. Supplies of citrus fruits were above those of the freeze-affected 1982 crop while noncitrus production fell more than 5 percent. Although total non-citrus production fell, the apple crop was 2 percent above the 1982 crop. Receipts for apples will likely fall below last year's \$828 million as large competing supplies of fresh oranges contributed to sharply lower prices for fresh apples. Higher prices for processed apples, which account for almost half of total use, were partly offsetting. In 1984, receipts from fruits and nuts may rise fractionally above the 1983 level as higher prices combine with a small increase in volume marketed.

#### Other Income

In addition to cash receipts from the marketings of crop and livestock products, farmers also receive other cash income from such farm-related sources as machine hire, custom work and recreational income. Income from these sources will be reduced this year to about \$1.9 billion compared with \$2.1 billion in 1982. The reduction will be due to lower income from machine hire and custom work due to drought reduced yields and acreage reduction programs. Increased planted and harvested acreage in 1984 will likely result in other cash income returning to 1982's level.

A significant contribution to 1983 gross farm income will be provided by Government payments. Direct payments (excluding PIK payments) through August totaled more than \$2.8 billion compared with \$1.4 billion at the same time last year. For the remainder of the year, payments will largely consist of diversion payments, wheat deficiency, storage payments, and conservation payments. Cash payments for deficiency, diversion, storage, and conservation programs are forecast to total about \$5 billion, helping to stabilize farm income and contributing to farm cash flow. With PIK payments (valued at the loan rate for the individual crop loan) totaling about \$4 billion in calendar 1983, direct Government transfers could total nearly \$9 billion. Another \$3 to \$4 billion in 1983 PIK payments could be delayed until the first quarter of 1984, as many farmers take full advantage of the 5 months of storage assistance. Cash payments in 1984 will likely be about half the expected 1983 level. Wheat deficiency payments will likely account for a large portion of cash payments in 1984.

The nonmoney income category of the farm income account represents the rental value of housing provided by farm dwellings and the value of farm products consumed directly in farm households. Including an estimate of nonmoney income in the farm income estimate is consistent with procedures used by the Department of Commerce to construct the National Income Accounts and allows a comparison of personal income of the farm and nonfarm population. The nonmoney imputations are excluded from the estimates of farmers' cash income and cash flow. The value of nonmoney income could total about \$14 billion in 1983 compared to \$13.9 billion last year. This change is due primarily to the reduced gross rental value of farm dwellings caused by the lower value of farm buildings in 1983. In 1984 we expect the nonmoney component of farm income to be slightly higher than in 1983, reflecting little change in the gross rental value for next year.

### Production Expenses

One of the most significant impacts of the PIK and acreage-control programs in 1983 has been a large reduction in farm input use and, consequently, production expenses. Acreage reduction is the major force behind the projected 2 to 4 percent decline in 1983 farm production expenses. Expenses, which have only declined twice previously since 1940 (1949 and 1953), are forecast to total about \$136 billion—compared with \$140.1 billion in 1982. Prices paid by farmers for all items, mirroring the slowdown in the general inflation rate, will rise 2 to 3 percent this year.

In recent years, as the farm economy has become more integrated with the general economy, there has been a close correlation between price changes in the overall economy and prices paid by farmers for their inputs. For example, in 1982 the producer price index rose 4 percent while prices paid by farmers for commodities and services, interest, taxes, and wage rates increased 3.5 percent. This year producer prices may rise 2 percent while prices paid by farmers increase 2 to 3 percent. These smaller changes in input prices, especially for manufactured inputs (fuels, fertilizer and lime, and ag chemicals), together with an easing in the average interest rate on outstanding debt have been important factors in shaping the production expense picture in the farm sector this year.

# Farm Production Expenses, 1980 - 1983

ITEM	1980	1981	1982	1983F
----- Billion Dollars -----				
Farm origin inputs..	32.3	31.6	31.1	31-33
Manufactured inputs.	22.9	24.7	23.6	20-22
Interest charges....	16.3	19.9	21.8	21-23
Other operating.....	27.0	28.3	31.2	29-31
Other overhead.....	30.2	32.6	32.4	31-33
TOTAL PRODN EXPENSES..	128.6	137.0	140.1	135-137

Nearly all expenses associated with crop production have been affected by the reduction in planted acreage. However, aside from seed expenses, it has been especially important in determining outlays for fertilizer, pesticides, fuels, repairs, and machine hire and custom expenses. Total farm input use in 1983 is expected to decline about 4 or 5 percent, the largest year-to-year drop since 1934. In addition to the decline in planted acreage, the further reduction in harvested acreage caused by drought losses will also contribute slightly to declining input use. Acreage abandonment means less custom harvesting, lower repair costs, and reduced fuel costs. The smaller corn crop will require less fuel for drying while the reduced cotton crop will decrease the amount of ginning required. Expenses for cotton ginning, which were \$500 million last year, are expected to fall by a third in 1983 before rising again with the larger expected cotton crop in 1984.

Production expenses for farm-origin inputs (feed, purchased livestock, and seed) account for nearly one-quarter of total expenses. These expenses, with the exception of seed, are associated with the production of livestock and are expected to rise about 1 to 3 percent above the \$31.1 billion of 1982. Higher feed prices, a result of the impact of acreage reduction programs and this Summer's drought on crop output, will combine with a slight rise in feed use to move feed expenses up nearly a tenth. Feed expenses in 1984 are forecast to increase slightly as increased feed prices are offset by reduced feed use during much of the year. Feed prices are expected to fall toward the end of the year and use is expected to move up if crop yields return to trend. Outlays for purchases of feeder and replacement livestock are expected to fall 6 to 8 percent this year after rising 7 percent in 1982. The number of animals purchased will likely fall 3 to 5 percent as declining inshipments of cattle and sheep more than offset an increase in inter-state hog shipments. Feeder livestock prices



are also expected to fall as feeder cattle prices and feeder pig prices each decline. In the year ahead, purchased livestock expenses are forecast to rise moderately. Most of the increase will come from higher feeder livestock prices since purchases of feeder animals will be up only a slight amount overall as purchases rise late in the year with the expected improvement in livestock-feed ratios.

Seed expenses in 1983 are expected to fall more than a tenth because of reductions in planted acreage. Planted acres were reduced significantly for corn (-27%), sorghum (-28%), rice (-29%), cotton (-28%), and soybeans (-12%). Seed prices remained largely unchanged as higher prices for corn, sorghum, and alfalfa, offset lower prices for wheat, soybeans, and potatoes. In 1984, seed expenses are forecast to rise significantly as planted acreage for most crops moves back near 1982 levels and seed prices average higher because of drought-reduced 1983 crops.

Expenses for manufactured inputs (fuel, fertilizer, electricity, and pesticides) are expected to show the largest percentage decline because of sharply curtailed use and decreases in fertilizer and fuel prices. Manufactured input expenses are expected to fall 12 to 14 percent from the \$23.6 billion of 1982. Fuel prices declined about 2 percent for the second consecutive year because of large supplies relative to demand. Combined with a decline in fuel used, fuel expenses could fall 11 to 13 percent after falling 3 percent in 1982. In 1984, increased acreage planted and higher fuel prices caused by a recovering general economy, could raise fuel expenses substantially above the expected 1983 level.

Fertilizer expenses are expected to fall 16 to 18 percent in 1983 from the \$9.0 billion of 1982. Reduced use, caused mostly by acreage reduction programs, led to declining fertilizer prices this year. Fertilizer use in calendar 1984 is expected to recover the losses of 1983 as acreage planted (with the exception of wheat) moves near the 1982 level. With demand for fertilizer increasing and farm prices during planting season above year earlier levels, fertilizer prices could increase significantly, leaving fertilizer expenses well above the 1983 level.

Pesticide expenses in 1983 are expected to fall 12 to 14 percent from the \$3.6 billion of 1982, due mostly to reduced use. Pesticide prices did not rise much this year, with reduced agricultural demand caused by acreage reduction programs an important factor. In 1984, rebounding use will be a major factor in the substantial rise expected for pesticide expenses.

Total farm interest expenses are expected to decline in 1983. While interest paid on real estate debt is expected to rise in 1983, nonreal estate interest expenses are expected to decline about 5 to 7 percent from the \$11.3 billion of 1982. Interest rates charged by farm lenders for short-term credit are expected to decline measurably from the 1982 averages. The average interest rate for PCA loans is expected to be about 11.9 percent in 1983, down from 14.6 percent last year. Although total nonreal estate debt outstanding on January 1, 1984, is forecast to fall slightly, average nonreal estate debt outstanding is



still expected to increase somewhat. Thus, all the decline in nonreal estate interest expenses will result from lower interest rates paid on the outstanding debt. This would be the first year-to-year decline in nonreal estate interest expenses since 1954. The percentage of total expenses accounted for by short-term interest charges--which measured about 8 percent in 1981 and 1982--will also decline slightly in 1983. Nonreal estate interest expenses will likely rise moderately in 1984, as both average interest rates and outstanding debt increase.

Real estate interest expenses are expected to rise at a slower pace than during the past few years. Although long-term interest rates have declined recently, the drop will not substantially affect the average rate on real estate debt outstanding this year, due to the longer turnover time for real estate debt. Average real estate debt, like nonreal estate debt, will likely rise at a reduced pace compared with the last few years. Real estate debt outstanding on January 1, 1984, is expected to be somewhat higher than the previous year. Real estate interest expenses are expected to be moderately higher in 1984, mostly because of increases in outstanding debt.

Because of a substantial drop in capital expenditures the last two years, depreciation of farm capital will likely decline 1 to 3 percent in 1983--the first drop since 1946. The continuing substitution of capital for labor together with rising machinery prices has caused depreciation, measured at replacement value, to rise substantially until recently. With capital expenditures expected to at-best, remain even with 1982 and more likely decline this year after falling heavily last year, depreciation of the smaller capital stock should decline. Whether-or-not depreciation falls in 1984 will depend on the degree of recovery in machinery sales which is expected to occur as cash income improves this year.

A new expense item, dairy deductions, will be included in the 1983 and 1984 expense accounts. This item, which was mandated by the Omnibus Budget Reconciliation Act of 1982, includes a 50-cent-per-hundredweight deduction from the proceeds of farm sales of all commercial milk marketings beginning on April 16, 1983 and an additional, potentially refundable 50 cents beginning on September 1, 1983. The net deduction from commercial milk marketings will be included as an expense item because the all milk price reported by SRS will not be adjusted for the net price deduction, but instead will continue to reflect the milk price at the plant. Thus, cash receipts for dairy will remain unchanged by the deductions but expenses will increase accordingly. In 1983, dairy deductions are expected to total about \$0.7 billion but could double in 1984, depending on the level of refunds earned by dairy farmers.

With input use expected to climb back to the 1982 level and prices paid expected to rise around the rate of inflation, production expenses in 1984 could rise substantially, above the level forecast for 1983. Outlays for manufactured inputs will likely rise the fastest followed by other operating expenses as farmers increase planted acreages. Interest charges and farm origin input expenses will likely rise at a more moderate rate than expenses for manufactured inputs. Acreage planted and thus to a great extent input use would be affected by any changes in farm programs. If currently announced programs (wheat and feedgrain) are altered, acreage withdrawn from production could change from levels currently expected.

## Income Indicators

Although nominal cash receipts will fail to reach a record-high level for the first time in six years in 1983, direct Government payments of about \$9 billion, \$6 billion higher than in 1982, and other cash income totaling nearly \$2 billion from custom work, machine hire, and farm recreational activities will provide a record-high level of total cash income. Meanwhile, spurred by the expected drop of nearly 5 percent in total input use and a rise of less than 3 percent in the cost of input items, cash production expenses could drop by more than \$3 billion.

Net cash income available to farmers for purchasing assets, loan retirement, and other expenditures is now expected to top \$43 billion, surpassing the 1980 record by about \$5 billion. Except for 1981, when the increase in cash sources of income failed to offset a \$6 billion increase in cash expenses, nominal net cash income available to farmers has increased each year since 1977.

The pattern of cash income growth could be altered in 1984 even though total cash income could again be at near record levels. Growth in crop and livestock receipts is expected to more than offset the decline in government payments, leaving total cash income up modestly. But, even with probable increases in total cash income, net cash income could drop. Both input prices and use are expected to increase next year and jointly contribute to a substantial rise in total cash expenses. The largest increase in expenses will likely occur for fertilizer, fuels, seeds, pesticides, repairs and operation, hired labor, and machine hire. With price increases now expected to be near the inflation rate, much of the increase in expenses will result from increased input use, reflecting an anticipated return to more normal planted acreages.

Net Cash Income, 1980 - 1984

ITEM	1980	1981	1982	1983F	1984F
	----- Billion Dollars -----				Change
Cash receipts.....	140.5	142.3	144.6	142-144	+
Cash Government pay...	1.3	1.9	3.5	8-10	-
Value of PIK commod...	---	---	---	3 - 5	N.C.
Total cash income.....	143.4	146.2	150.1	153-155	+
Cash expenses.....	105.3	111.5	113.8	109-111	+
Net cash income 1/....	38.1	34.7	36.3	42-44	-
Deflated cash inc 2/..	21.3	17.7	17.5	19-20	-

1/ Includes net CCC loans as receipts. 2/ Deflated by the GNP implicit price deflator, 1972=100.

In addition to cash receipts from the sale of agricultural products, the farm production sector also has other cash sources of funds from real estate and nonreal estate business loans, net changes in currency and demand deposits, and rental income from agricultural resources. A large share of the cash from loans would be expected to be used for input purchases or the purchase or repair of capital items--tractors, machinery, buildings and improvements. Net cash flow is the sum of net cash income from farming, loans and net rent, less expenditures for capital items and is a measure of the change in cash available for business operations, purchases of real estate, and household consumption. Current indications suggest that gross cash flow could rise a tenth above the 1982 level. The sources of gross cash flow will also change considerably with cash income from farming and rentals accounting for more than 90 percent of gross cash flow. Changes in loans outstanding are expected to fall more than a third from the \$6.8 billion level of 1982 and be only a fifth the \$18 billion average level borrowed during 1979, 1980, and 1981. Capital expenditures are also expected to remain near their 1982 level, leaving net cash flow up about a tenth and near the level attained in 1981.

Looking ahead to 1984, gross cash flow could remain near 1983's expected level but the sources of funds could change again with increases in borrowing offsetting a decrease in net cash income from production. Capital expenditures are also expected to increase measurably, leaving net cash flow down fractionally.

When measuring economic conditions in the farm sector in terms of the traditional net farm income accounts, which include income from production as well as income and expense imputations for the rental value of farm dwellings, the value of home consumption, depreciation and inventory changes, net farm income has been much more volatile in recent years than net cash income. This has been mostly due to dramatic swings in the weather and the attendant large swings in inventory adjustments in recent years.

The large 1981 and 1982 crops and resulting large carryover entering this year followed by the drought-reduced crop and expected subsequent inventory drawdown will again give the inventory adjustment a prominent role in determining the level of net income this year. Prior to onset of drought this Summer the inventory adjustment was expected to be from \$1 to \$4 billion negative. Current indications suggest that the decline could well exceed \$7 billion. This large increase in the inventory adjustment will be partially offset by increased receipts, leaving net income in a range of \$24 to \$26 billion.

The net farm income outlook for 1984 not only includes assumptions about next year's crop and livestock prices and production, but also of carryover at the end of next year. Current prospects will be influenced in coming months by production and acreage decisions here and abroad, farmer's decisions on program participation next Spring, decisions on input use and capital purchases, strength of the developing economic recovery here and abroad, especially as the recovery affects interest rates and input prices, and, of course, the weather during the next growing season. Despite these many uncertainties, the current perspective is that the 1984 net income level could be substantially above the level forecast for 1983.



# Net Farm Income, 1980 - 1984

ITEM	1980	1981	1982	1983F	1984F
	----- Billion Dollars -----				Change
Cash receipts.....	140.5	142.3	144.6	142-144	+
Government payments 1/	1.3	1.9	3.5	8-10	-
Inventory change.....	-5.3	7.6	-1.9	-6 - -8	+
Gross farm income.....	150.1	167.1	162.2	160-162	+
Production expenses...	128.6	137.0	140.1	135-137	+
Net farm income.....	21.5	30.1	22.1	24-26	+
Deflated net income 2/	12.0	15.4	10.7	11-12	+

=====

1/ Includes value of PIK payments.    2/ Deflated by the GNP implicit deflator, 1972=100.

It now appears that total cash receipts, led by a strong recovery in the crop sector, owing to relatively high first-half prices and projected strong second-half marketings, will more than offset a projected drop in Government payments to leave gross income well above the level expected for 1983. But, total expenses, led by purchases of manufactured inputs could also increase considerably in 1984. Reflecting rebuilt stock levels if there are more normal crops next year, the inventory adjustment in 1984 would also add significantly to net income.

## Income Variability

The farm sector has become more diverse over the years and aggregate indicators are less useful for describing the economic conditions for any particular group of farmers. Income measures are highly variable depending upon commodity produced, region, farm size, debt structure and off-farm income opportunities. This year the drought will create wide differences in the incomes of individual farmers. In drought areas, particularly those areas of the Southern Plains, Midwest, and Southeast hit by extreme drought, farmers who choose not to participate in the commodity programs or buy insurance will likely have low returns from production this year. While crop prices have risen, these farmers will likely have little to sell. Thus, while aggregate income will be improved this year due largely to decreased expenses, the receipts of many farmers in drought areas probably will not cover cash expenses, leaving many farm families



in a difficult financial situation. Meanwhile, some farmers will have good yields. For these operators, crops will be large and prices high, resulting in cash incomes that could be an all-time high.

Farm Income and Income Per Farm, 1980-1984

ITEM	1980	1981	1982	1983F	1984F
	----- Billion Dollars -----				Change
Farm Income:					
Farm sources	21.5	30.1	22.1	24 to 26	+
Off-farm sources	37.7	39.9	39.4	40 to 42	+
All sources	<u>59.2</u>	<u>69.9</u>	<u>61.5</u>	<u>64 to 68</u>	+
	----- Dollars -----				
Per-farm income:					
Farm sources	8,857	12,349	9,188	10,100 to 11,000	+
Off-farm sources	15,511	16,383	16,430	16,900 to <u>17,700</u>	+
All sources	24,368	28,733	25,618	27,000 to 28,700	+
1972 \$ <u>1</u> /	13,644	14,697	12,381	12,500 to 13,300	+

=====

1/ Deflated by the GNP implicit price deflator.

Total income per farm from all sources depends substantially on off-farm sources of income. Off-farm income, which includes nonfarm wages and salaries, pensions, and interest income is expected to total about \$41 billion in 1983, up from \$39.4 billion in 1982. This will account for over 60 percent of total incomes of farm families in 1983. Since 1980, off-farm income has accounted for the majority of total income for farms with sales of less than \$100,000 of agricultural products per year, while comprising a much smaller amount of total income of farms selling over \$100,000 of farm products per year. Thus, large commercial farmers, who account for most of the U.S. agricultural output, are likely affected most by swings in farm prices and income.

In 1983, nominal income per farm from all sources is expected to total about \$27,700, up from \$25,618 in 1982. In 1972 dollars, total income per farm is expected to be \$12,848, up about 4 percent from last year. In 1984, both the nominal and real per farm income values are expected to rise as income from farm and nonfarm sources each increase.

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The financial situation of the individual farmer varies widely. This year in particular his financial condition depends on whether or not he participated in Government programs, how he was affected by the drought, and what types of commodities he produced. As we will discuss later in the paper the most important factor in determining the financial health of a farm business today is the financial structure of the firm.

The performance of three major financial variables over the last four or five years goes a long way in explaining the current financial condition of the farm sector. Trends in farm income, interest rates, and farm equity have been uniformly adverse since 1980.

#### Farm Income Improves But Remains Low

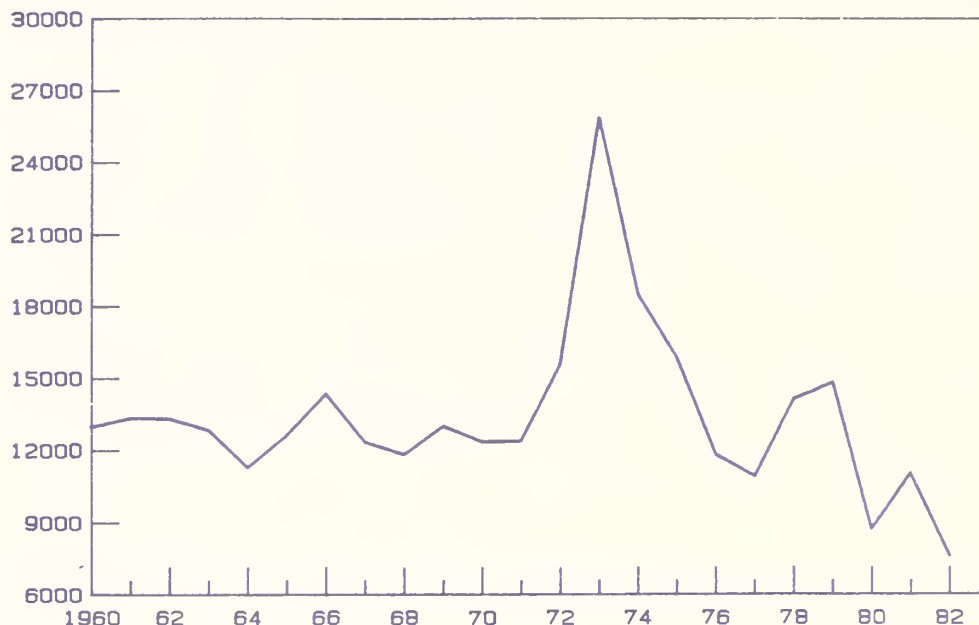
From 1960 to 1972 real net farm income was relatively stable and had a flat trend (figure 1). However, the United States entry into international commodity markets in 1973 introduced a new source of instability to net farm income. Also, since 1973 there has been a clear downward trend in real net farm income. This downward trend appears in most inflation adjusted measures of net farm income (net cash income, net farm income per farm, total family income, and total family income per farm). As a result of these trends in farm income, rates of return on equity capital have been depressed since 1980. During the seventies the average income rate of return for the sector was about 3.8 percent. Since 1980 it has averaged 1.5 percent. The result has been severe cash flow problems for highly leveraged operators.

The U.S. agricultural sector is now fully integrated into the international economy. However, the strong export growth which occurred during the seventies is expected to moderate in the eighties. The decline in the growth in U.S. agricultural exports is due largely to the strong U.S. dollar and slow economic growth world-wide. Without considerable improvement in the growth in agricultural export demand, one cannot expect much improvement in the farm income picture in the near to intermediate term.

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Figure 1. Real Net Farm Income.

Million 1967 dollars



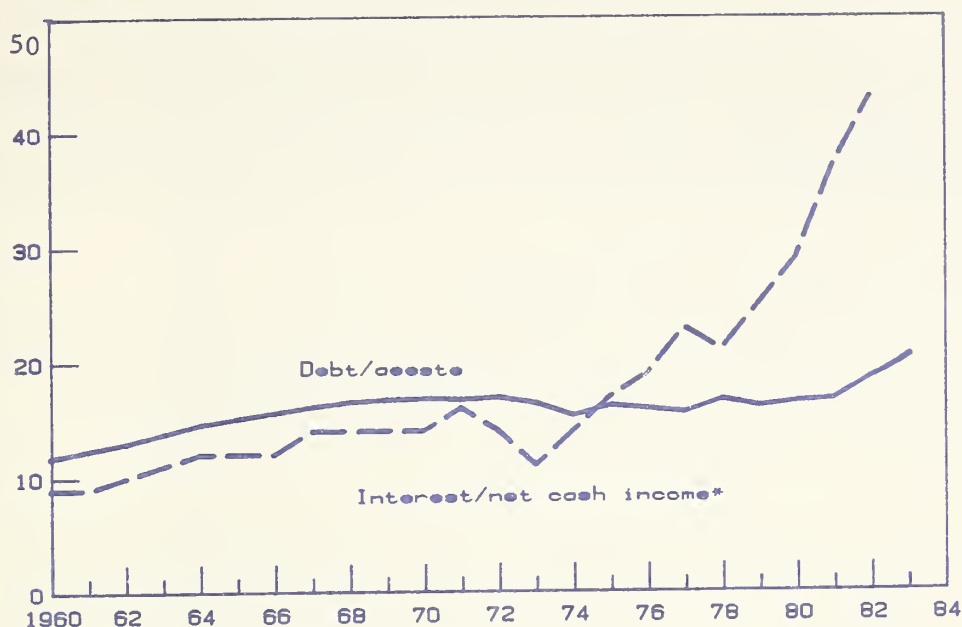
#### Farmers' Debt Burden

The debt burden in the farm sector is at an all-time high. Whether measured in terms of the ratio of debt to assets or interest expenses to net cash income, never has the sector been so burdened with debt servicing obligations. The two measures of financial leverage mentioned above can tell much different stories as is illustrated in figure 2. From 1960 to 1972 the debt/asset ratio rose gradually to a peak of 16.9 percent after which it stabilized in the 15.5 to 16.5 percent range through about 1979. This stability occurred while the value of farm assets and debt rose at unprecedented rates. More recently the debt/asset ratio has increased from 16.1 percent in 1979 to 20.6 percent in 1983. Clearly, the rapid rise in asset values during the seventies masked the true trend in the debt burden. Although the interest/ net cash income ratio rose gradually along with the debt/asset ratio in the sixties, it rose rapidly in the seventies while the debt/asset ratio displayed considerable stability. Since 1979 both indices have been rising.



Figure 2. Indices of the Debt Burden in Agriculture.

Percentage



\* Net cash income before deducting interest.

Growth in farm debt accelerated during the seventies (figure 3). From 1960 to 1970 farm debt grew at a compound annual rate of 7.9 percent. The growth rate increased to 9 percent in the first half of the next decade and 15 percent in the second half. During the eighties the growth in farm debt has moderated considerably due to record high interest rates, a continued declining trend in net farm income, and weak farmland values. Since 1980, farm debt has grown at a rate of 9.3 percent per year and it appears that this growth rate is falling. In fact, total farm debt could decline in 1983 for the first time since the mid-forties.

Farm debt is likely to continue to grow at reduced rates. Agricultural interest rates are still at extremely high levels and are expected to remain high for the intermediate term (figure 4). Farm income is not likely to reach the high levels hoped for in the early seventies, and farmland values will probably rise only moderately over the next few years, thereby reducing growth in credit capacity. As will be discussed later, the current relationship between farmers' rate of return on assets and the interest rate discourages the use of debt for firm growth.

#### Farm Wealth Peaked in 1980

Real farm equity rose only modestly during the sixties and then grew rapidly in the seventies as farm real estate values increased at unprecedented rates (figure 5). This growth in farmers' wealth provided the collateral necessary to support a comparable increase in debt use.

Farm equity provides lenders with the security needed to continue with customers experiencing cash flow difficulties. Since real farm equity has been declining for many farmers since 1980, farmers' borrowing capacity has contracted and many lenders are putting greater emphasis on cash flow analysis.

### Debt Use and the Financial Well-Being of Farmers

Financial leverage is probably the single most important determinant of the financial status of the individual farmer during the agricultural recession. Commodity programs, reduced production expenses, and recently improved prices have provided relief, but many farmers are still carrying large fixed financial obligations.

Although about half of all farmers have no debt at all, this fact must be put into perspective. The 1979 Farm Finance Survey of the Census of Agriculture indicates that on January 1, 1980 about 46 percent of all farmers were debt-free. It also pointed out that 85 percent of farmers generating sales of \$100,000 or more have some

Figure 3. Farm Debt.

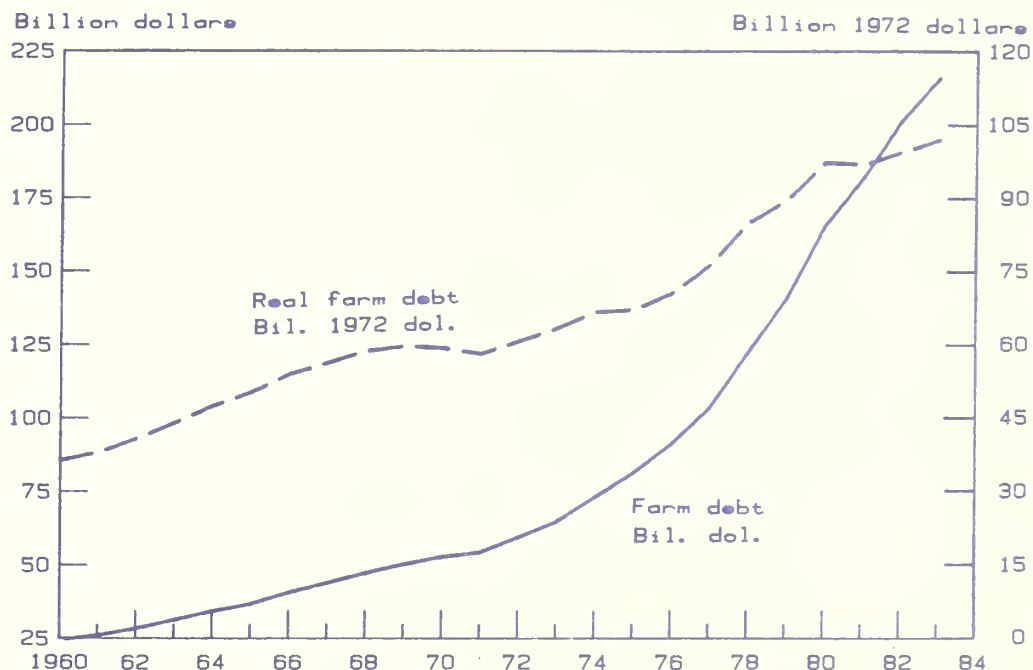
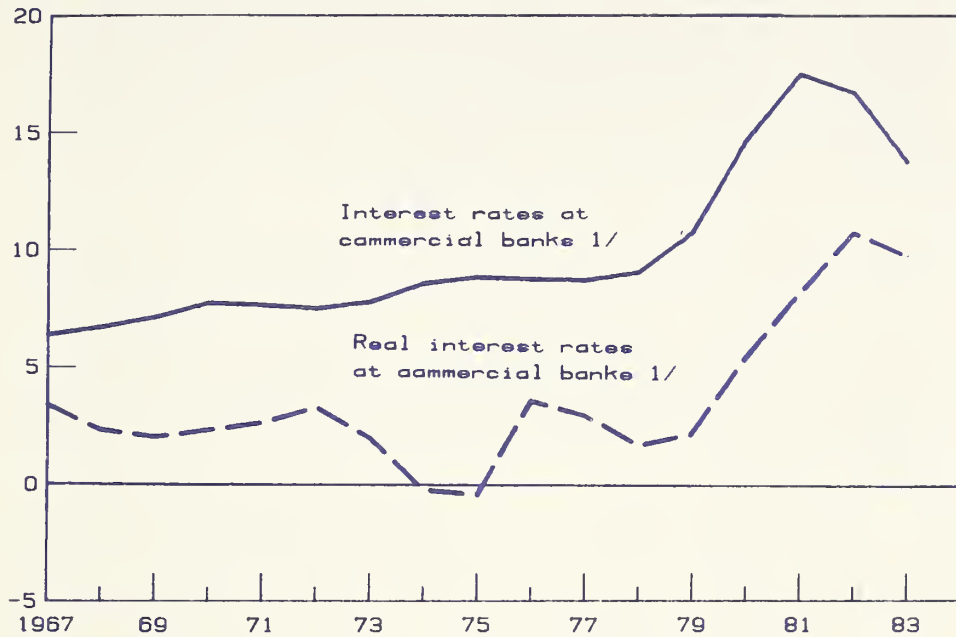
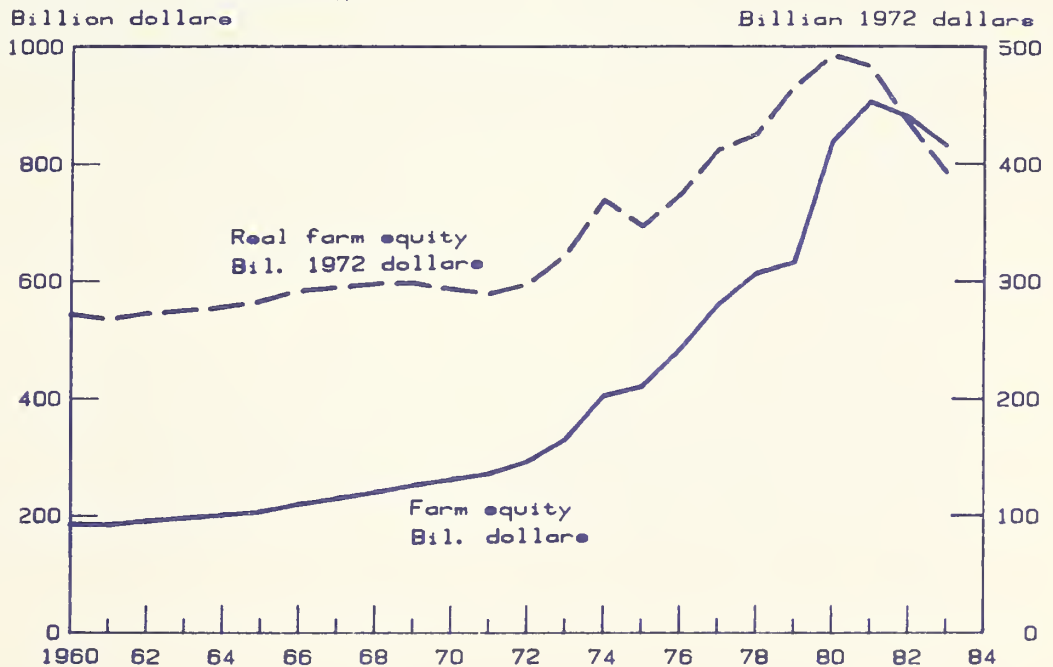


Figure 4. Agricultural Interest Rates.  
Percent



1/ Typical rates on feeder cattle loans in the Chicago Federal Reserve District.

Figure 5. Farm Equity.



debt. In fact, they owed about 60 percent of all farm debt. Since these commercial sized farms represented only about 12 percent of the total farm population, it follows that about 10 percent of all farmers owed about 60 of all farm debt. These farmers generated about 57 percent of all farm cash receipts. Hence, we see that farm debt is highly concentrated among large commercial farmers. Therefore, a characteristic of agriculture is that most commercial farmers do have debt and some of them have considerable debt. For example, the average debt/asset ratio of farmers with sales of \$500,000 or more was 37.4 percent in January 1, 1983. This compares with 20.6 percent for the sector as a whole.

The distribution of farm debt by debt/asset ratio indicates a dimension of the risk exposure of the agricultural assets of farm lenders. About 65 percent of all farm debt is owed by farmers carrying debt/asset ratios over 40 percent. Farmers with debt/asset ratios of 70 percent or higher owe about 30 percent of all farm debt. Hence, the majority of all farm debt is held by high-to very highly-leveraged operators--precisely those operators who are most vulnerable to unstable commodity markets.

The effects of financial leverage on the profitability of a farm are illustrated in table 1. In 1982, the average rate of return to farm assets was 3.1 percent; the sector debt/asset ratio was about 20 percent; and the average interest rate on outstanding farm debt was about 11 percent. These factors combined to provide an average rate of return on equity capital of about 1.1 percent, the lowest rate of return in almost 50 years. The rate of return on equity capital measures the farmer's income return on his investment after taking into account his financing costs. It is important to note that financial leverage has a favorable effect on the return on equity only when the rate of return on assets exceeds the rate of interest. Otherwise, it has an unfavorable effect. This is illustrated in the table and can be seen by comparing the return on equity as leverage increases under alternative interest rate scenarios. During the 1970's, the capital gains associated with rapidly rising farmland values made the use of financial leverage an effective strategy for magnifying farmers' total return on investment (equity) in spite of its adverse effects on cash flow. However, in a farmland market which provides little growth in land values, a strategy of balance sheet restructuring to lower the degree of financial leverage will be necessary for farmers with high financial leverage.

Since the farmer's profitability depends on his rate of return on assets, his debt/asset ratio, and his average interest rate, it is impossible to estimate how many farmers are making a negative return on equity. However, some useful insights can be derived. The farm lending industry is primarily concerned with the financial condition of those farmers who have debt. The Census of Agriculture Farm Finance Survey indicates that in 1980 about 50 percent of all farm debt was held by operators with debt/asset ratios over 40 percent. It has



been estimated that as much as 65 percent of the debt is owed by operators in that category today. If these operators are earning the average return on their assets and pay the average interest rate, they are making a negative rate of return on their investment (based on the current market value of their assets). In order for those carrying a debt/asset ratio of 40 percent to generate a zero rate of return on equity, the return on farm assets must reach about 4.4 percent, slightly under the average for the decade of the seventies excluding the 1973 aberration of 9.7 percent. How much can we expect the average rate of return on farm assets to rise during the next few years? Can we expect it to reach a level substantially greater than what had been experienced during the seventies? At best, the rate of return on farm production assets will rise only very gradually given near term projections for crop and livestock markets.

It is estimated that in 1983, up to 18 percent of all farm operators fall in the over-40 percent debt/asset ratio category. Those farmers owe about two-thirds of all farm debt. It is true that some of those farmers earn a rate of return on assets which is greater than the national average. Some pay more and some pay less than the average interest rate on outstanding debt. Also, many have greater than a 40 percent debt/asset ratio. Taking these factors into account,

Table 1. The effect of alternative debt/asset ratios and average interest rates on farm profitability in 1982

Debt/asset ratio	Interest rate on outstanding debt			
	-----Percent-----			
	3	7	11	17
Return to equity capital in 1982				
	-----Percent-----			
0	3.10	3.1	3.1	3.1
20	3.13	2.1	1.1	- .4
30	3.14	1.4	- .3	- 2.9
40	3.17	.5	- 2.2	- 6.2
60	3.25	- 2.8	- 8.8	-17.7
80	3.50	-12.5	-28.5	-52.5

Source: Table 1 is a modified and updated version of one presented by Emanuel Melichar, "Update Tables for Developments in Agricultural Finance," Division of Research and Statistics, Board of Governors of the Federal Reserve System, March 21, 1983, Addendum Table 1.

it seems apparent that significant numbers of farmers--mostly commercial sized farmers with little off-farm income--will be experiencing cash flow difficulties in the foreseeable future. A relatively large percentage of the customers of farm lenders will continue to have cash flow problems. It is likely that a rather dramatic farm policy initiative or an export market recovery would be required to improve commodity prices enough to provide a sustained rate of return on assets at a level significantly higher than historical rates of return. Hence, progress must come through a substantial lowering of average interest rates and/or significant balance sheet restructuring at the farm level to reduce the debt burden. Neither of these options will be accomplished easily.

#### Agricultural Finance Outlook for 1984

The outlook for 1984 suggests stable but continued difficult conditions for many farmers. Net farm income should improve somewhat but remain at a relatively low level in real terms. Interest rates are expected to remain high in 1984. In fact, they may rise somewhat during the year. Since the inflation rate is expected to remain low, in the 4 to 5 percent range, real interest rates will stay at record levels. This assumes that the Federal Reserve Board will be successful in restraining money growth enough to prevent a recurrence of inflation in the future but not enough to snuff out the recovery.

The decline in farmland values which began in 1981 appeared to have bottomed-out and reversed by the middle of this year based on several Federal reserve bank surveys. However, at this writing it is not certain what effect the drought might have had on the market for farmland. In any event, one should not expect substantial real growth in the value of farmland in 1984 (table 2).

Real farm equity may decline for the fourth consecutive year in 1983 and the prospects for 1984 are not good. Hence, the real wealth of the sector could continue to slide through 1984 reducing borrowing capacity and maintaining the demand for Government farm loan programs.

With the encouragement of lenders, heavily leveraged farmers will continue to tighten their belts in order to restructure their balance sheets and improve cash flow. Debt growth will continue to moderate and could decline in absolute terms. Farm real estate debt is expected to have increased only 2 to 4 percent by January 1984. Non-real estate debt could be 7 percent less at the beginning of 1984 than the previous year. Commercial banks are the only farm lenders in either the real estate or non-real estate loan markets who are lending at a relatively strong pace.

Table 2. Farm Sector Balance Sheet\*

<u>Assets:</u>	<u>1983</u>	<u>1984</u>	<u>% Change</u>
	(Billion dollars)		
Real estate assets	773	790-805	2 to 4
Non-real estate assets	276	270-294	-2 to 7
Total assets	1049	1060-1099	1 to 5
<u>Liabilities:</u>			
Real estate debt	110	112-114	2 to 4
Non-real estate debt	106	99-106	-7 to 0
Total liabilities	216	211-220	-2 to 2
Equity	833	840-888	1 to 7
Debt-to-asset ratio	20.6	19.2-20.8	

\*As of January 1.

Although it has become more difficult for farmers to qualify for credit, money is available. As in the past year or two, the major constraint to obtaining farm credit in 1984 will be the condition of the farmers' financial statements. Creditworthy operators will have no trouble obtaining loan funds in 1984.

The slower growth in farm debt in 1983 and the expected continued slow growth in 1984 could lead to a reduction in the debt burden in terms of both the debt/asset ratio and the ratio of interest expenses to net cash income. Continued improvement in this area will require dramatic changes in the trends of interest rates, farm debt outstanding, or net cash income. Even a reduction in the growth of the interest to net cash income ratio would alleviate much of the financial pressure in the sector.

Important adjustments are occurring in the sector that will lead to a stronger, more profitable sector in the future. Farm liquidations are occurring at higher than normal rates and can be expected to continue at least for the next couple of years. Hence, the sector

will be purged of many inefficient or poorly managed businesses. As mentioned above, slower debt growth will lead to an improved financial structure for high leverage operators as well as the sector as a whole. Gross investment has been declining for the past three years while net investment has been negative since 1981. Although the final investment experience for 1983 is still unknown, it is likely to be weak. Low farm income, high interest rates, and a reduction in acreage planted has kept the demand for farm machinery and equipment low. This occurred in spite of an initial boost to cash flow and machinery sales due to the Payment-In-Kind (PIK) program. A continuation of this trend could lead to a reduction in agriculture's productive capacity, ameliorating the current over-supply problem.



W. D. (Bud) Willer, American Bankers Association

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Washington, D.C.

For Release:



As we reflect back to the end of 1982 and these first ten months of 1983, it seems apparent that the crisis decisions and economic alarm at the end of 1982 have subsided to some degree during 1983 and in general this is due to the PIK program. The year of 1983 has been a time of adjustment, both from the farmer or producer-borrower standpoint and the lenders standpoint. PIK, in a great many cases, has afforded the opportunity to project a positive cash flow and delay hard decisions until the end of 1983 and possibly till the first quarter of 1984.

On the horizon, however, the drouth, especially in the midwest corn belt and parts of the south and southwest, has compounded the economic problems of agriculture as we move into 1984 and probably beyond. The areas with drouth situations are not only presenting problems to producers, but are compounding problems of lenders also. It appears that the outlook for relief in any sector of agriculture, producer, agri-business or lender will not be forthcoming in the near future. After visiting with commercial bankers across the nation and with farm credit people in my immediate area, I am judging that 1984 is going to be a hard year.

#### Conditions at end of 1982 and start of 1983

Seems appropriate to review briefly a few factors which contributed greatly to our present dilemma in agriculture:

1. Inflation was the main culprit with rising land costs as much as 20% in one year.
2. Past two years dramatic rise in interest rates culminating by the end of 1982 in many negative cash flows for producers and actual dramatic drop in net worth, due to a decrease in market values of land and livestock and commodity prices.
3. With increase in value of dollar, export markets were decreasing and no prospect of expansion of these markets due to world wide recession.
4. As producers over-produced by trying to compensate for the above decreases realized in cash flow, surpluses piled up compounding solutions to the problems.

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### What has transpired during 1983?

As we started 1983, some lenders had made some hard and distasteful decisions already at the end of 1982, but many were yet to come in the first quarter of 1983. Commercial ag bankers and other ag lenders scrambled the first half of 1983 in various ways to keep their borrowers and themselves on an even kiel. Lenders suggested partial liquidation in many instances, which was selling off portions of land, machinery sales or tightening up on risk factors with borrowers by hedging either in livestock operations or of commodities and forward contracts.

One big factor which assisted producers of commodities was the PIK program. When PIK's potential was interjected in cash flow projections, many appeared to have positive positions again, so PIK very definitely in the short run had a good and positive effect. Now later in 1983, of course, we see side effects detrimental to the livestock industry with narrow margins.

As we move on in 1983 to mid year, it becomes more apparent that with the advent of partial liquidations of personal property, prices received for machinery and livestock are getting stickier and stickier. Also, land acres being offered for sale were increasing by the month, which stalemated sales in many areas, thus decreasing the possibility of debt reduction for those in trouble. With most of these factors coming to light, investors also became reluctant to invest. Another side effect from the above problems being faced was the moral outlook on payment of debt. More bankruptcies appeared or came to the surface in 1983.

The ABA, American Bankers Association, took a mid year survey in July, the final results of which will be given at our November conference in Los Angeles, however a preliminary summary would indicate the following:

1. Deterioration of ag portfolios continued in 1983 but at a slower rate or not as drastically as in 1982.
2. Financial situations appeared to ease, partly due to PIK projections.
3. Fewer borrowers were loaned up to their credit limits, this also partially due to PIK, which cut back inputs necessary under the program.
4. Credit has slowed or there is less demand during the first half of 1983.
5. Banks have ample funds for loaning. Loan to deposit ratios, which had an average of 67% in 1979, now show 61% as an average with many below this.
6. Interest rates have averaged 13½% on ag loans this year. This is down 2½% from a year ago.
7. Per cent increase in farm debt appears at this point to be the smallest increase in many years.

This survey is being done and compiled by Bill Herr, head of Agri Business and Economics Department at Southern Illinois University.

Another factor which I mentioned in my opening remarks that is affecting the ag economy is the drouth. On top of the financial or economic problems facing the producer, we add on further stress from the drouth situation. Those who did not participate at all or to any great extent in the PIK program face more severe financial burdens. Livestock people in drouth areas also are facing real problems as the cost of feed has risen dramatically causing many western cow herds to be put on the auction block. Feed prices are also having their impact on all livestock programs; dairy, hogs and poultry. In the drouth areas, and it is true in other areas also but more pronounced in the drouth areas, lenders are seeing a second tier of producers having more severe financial problems. By second tier I mean borrowers that have been in the business longer than 10 years, ones that have been good managers in general and also have kept their noses to the grindstone. This is a group whom many lenders felt would weather this period, not necessarily unscathed but could pull through O.K. Some of these may be faced with debt reduction decisions.

I have mainly talked about the producer in agriculture up to this point and I think we should consider the agri business sector also and touch on the ag lender as well. I can only voice an opinion on the commercial bank area.

Many agri businesses have felt the troubled times of the producer showing up in slow accounts receivables plus more producers entering into delayed payments by entering a type of reorganization under bankruptcy proceedings. We are seeing the large elevators feeling the effects of PIK on the other side by having less grain in storage, thus less income to the grain dealer. This is just now appearing as a problem for 1984 and possibly beyond. Machinery dealers have had the tightening of the belt already and from visiting with bankers across the nation in a conference call just recently and other private conversations, it appears that we will continue to have problems with many agri businesses during 1984 and probably more pronounced than even in 1983.

Ag bankers, as a part of the ag lending sector, are having some real struggles in 1983. We have seen a marked increase in charge off loans as well as an increase in non earning assets or non accrual loans. These two factors coupled with less loan demand will see earnings of agricultural banks decline in the year of 1983.

In looking at 1983 as a whole, I would like to say that in general it has been a year of readjustment. On the positive side, PIK has afforded some breathing space for the producer of commodities. Many will be helped enough to probably get them through this economic down turn. On the other hand it has only delayed the fish or cut bait decisions we know are necessary for others. What per cent of the borrowers will not be with us in 1984 or in 1985 I don't believe anyone can predict, but I will say this, there will continue to be more getting out of production agriculture in the next two years than the average we've had in the past. Agri businesses will be tightening their belts further in 1984, especially if they are in lines dependent on large ticket items.



### What is ahead for 1984 and possibly beyond

From a lenders point of view, it appears that some of the old conservative guidelines will be the vogue in the near future. The conservative approach will and should be used in making business and lending decisions. Cash flows are necessary for any projections with progress being measured by retained earnings and earned net worth.

Do not see 1984 being a good year in agriculture as may be the case in some areas of the economy as the stock market seems to indicate. I think 1984 will be more of the same, with production agriculture having problems and borrowers facing continuing difficult decisions along with lenders needing patience and time to help work out of this struggle for profit.

Why do I see continuing problems? Let's take what our producers are saying. We can't stand to have more money for disaster loans as we can't pay back what we have now. I agree. With no PIK in 1984, fence row to fence row planting will probably be the program again. This was no solution before.

Another area to be faced in 1984 is the dairy surplus. Already, dairymen are feeling the pinch in many areas according to a conference call survey recently with ag bankers from New York to California. If cow numbers are reduced by sale of these cows, this will of course affect the other red meat industries, a problem which is still on the horizon for 1984.

In looking ahead it appears that the agricultural sector of our economy will be the laggard in pulling out of the economic slump. It has problems ahead that will take stable government policies directed at long term solutions rather than reactions to crises situation. Inputs from all segments or levels of agriculture must be heard in order to have solidified direction. Programs in areas of expanded markets appear necessary and may be less expensive than direct crises subsidies to producers.

In summary, I would like to say that 1983 has been a leveling off period with not as many crises situations arising, however, problems are still with us. We will see these problems continuing into 1984 and probably more than we've had in 1983. Patience and time on all those involved will be necessary to avoid depressing the market price of land and personal property further, which will help no one. We will need another turn downward in interest rates to assist in helping our producers to climb back. If this is not possible we will see some of those second tier producers in trouble by the end of 1984.



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#### ABSTRACT

With increased crop acreage projected for 1984, demand for both fertilizer and pesticides should be up substantially. Field crop acreage in 1984 is likely to be 11 to 17 percent greater than in 1983. Corn acreage, which accounts for 40 percent or more of all fertilizer and pesticide use is projected to increase about 37 to 43 percent. Plant nutrient consumption is likely to be about 20 percent greater than last season, while pesticide use is expected to increase somewhat less, though this may vary with pest infestation levels. With excess production capacity and substantial fertilizer and pesticide carryovers from 1983, supplies of fertilizer and pesticide materials should be ample for 1984.

#### INTRODUCTION

Fertilizer and pesticide use grew substantially in the 1960's and 1970's, but growth has leveled off in recent years. Demand for both fertilizer and pesticides was further reduced in 1983 because of PIK and other acreage reduction programs. Use of both fertilizer and pesticides in 1984 will probably return to 1982 levels, but fertilizer consumption will remain below that in 1979-81. Indications are that there will be only modest growth for both fertilizer and pesticides in the next several years. Pesticide supply projections in this paper are based on a September 1983 survey of basic manufacturers. Fertilizer supply projections are based on a variety of public and private information sources. Demand projections are based on anticipated changes in acreages of crops likely to be grown in 1984.

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## FERTILIZER

Fertilizer supply and use patterns for the 1984 crop year are likely to be similar to 1982. Plant nutrient consumption that year was down 10 percent from the previous year and lower than it had been since 1978. Production of all materials was off from a year earlier, with phosphate production down nearly a fourth and nitrogen production off by almost 10 percent. Beginning inventories were up substantially and imports and exports were at their lowest levels since 1979.

Total nutrient consumption for 1983/84 is estimated at about 22 million tons with somewhat over 11 million tons of nitrogen, nearly 5 million tons of phosphate and almost 6 million tons of potash likely to be applied.

With strong demand, fertilizer prices should pick up. However, October 1983 farm fertilizer prices averaged about 5 percent below a year ago and about 3 percent below last Spring. On the other hand, producer prices this Fall are up. Producer FOB prices of anhydrous ammonia at New Orleans in late October 1983 were quoted at 20 to 25 percent above a year ago. Finished phosphate fertilizer product FOB prices in Central Florida were quoted at 5 to 10 percent above a year earlier. Farm price increases for Spring 1984 are expected to average about 10 percent over the Spring of 1983 for nitrogen products and about 5 percent for phosphate, with little change expected for potash materials. Fertilizer prices followed the normal Spring to Fall price drop in 1982, but with the PIK program announced in early Spring of 1983, fertilizer prices did not show the typical price gain from the Fall of 1982 to Spring of 1983.

### Nitrogen

Nitrogen supplies for 1983/84 agricultural and industrial uses could be up about 10 to 13 percent over last season. Although fertilizer use is expected to increase about 20 percent, supplies should be adequate. Starting nitrogen inventories for the 1984 crop season were down 8 percent from a year ago. Planned nitrogen production is up only 10 percent, but imports are expected to increase about 15 percent while exports could drop more than 10 percent. This follows an 8 percent rise in imports last year and a 20 percent drop in exports.

Because of rising natural gas costs, U.S. producers are less competitive in world markets. About one-fourth of the U.S. ammonia production capacity is currently shut down and while some plants will come back on stream with the increased demand, many of the higher cost plants may not reopen.

## Phosphate

Phosphate supplies are expected to increase about 8 percent and should be adequate for domestic use and exports. Phosphate inventories at the start of the 1983/84 season were about the same as at the start of the 1982/83 season. Phosphate production for 1983/84 is expected to be about 8 percent greater than last season, following an increase of 8 percent in 1982/83 over the previous year. Imports are insignificant in the U.S. phosphate market at about 1 to 2 percent of total supplies. Exports account for a major share of U.S. phosphate production (typically about 40 percent). Phosphate exports increased 5 percent in 1982/83 and could rise over 10 percent in 1983/84.

## Potash

Potash supplies for 1983/84 are expected to increase about 17 percent after a 8 percent drop last season and bringing supplies to about 1981/82 levels. With an agricultural demand increase of about 20 percent anticipated, carryovers to 1984/85 should be smaller than into 1983/84. About 80 percent of net U.S. potash supplies is imported, largely from Canada. Potash imports should be up about 17 percent after an 8 percent drop in 1982/83. Exports of potash by U.S. producers are minimal amounting to about 10 percent of U.S. supplies.

## PESTICIDES

Because of reduced crop acres, pesticide demand dropped about 14 percent last season. Consumption for the 1984 crop season is expected to return to about 1982 levels.

Supplies of all types of pesticides are expected to be ample for the 1984 crop season. Although overall pesticide production is expected to be down slightly (about 2 percent) large inventory carryovers from the 1983 season, up about 26 percent overall from a year earlier and equivalent to over 40 percent of last season's net supplies, assure plentiful supplies of pesticide materials.

Only herbicide supplies are expected to be down (about 6 percent) while insecticide and fungicide supplies should be up 7 and 6 percent respectively. Herbicide production for the 1984 season is planned at 18 percent less than last season but inventories carried over from last season are nearly a third greater than a year earlier and represent over 60 percent of the production for 1983. Herbicide supplies are expected to exceed requirements for 13 major field and forage crops in 1984 by about 40 percent. Insecticide supplies are expected to exceed requirements for these crops by 100 percent.

Exports account for a major share of the U.S. pesticide producers' market. Typically, about one-fourth to one-third of U.S. pesticide production in terms of active ingredients is exported. Pesticide exports are expected to be up nearly 10 percent for 1983/84, with 27 percent of the herbicide and 36 percent of the insecticide production intended for export.

In spite of anticipated substantial increases in domestic and export consumption, pesticide facilities are expected to be operating at less than 50 percent of capacity for the 1984 crop season. The herbicide facility planned operating rate is estimated at 54 percent and the planned insecticide facility operating rate at just over a third of capacity. This compares with operating rates of 75 to 90 percent of capacity in the mid- and late 1970's.

Pesticide prices quoted to distributors for the 1984 crop season are almost unchanged from last season. Prices are reported steady--up 1 percent for all types of pesticide materials. This compares with overall stable farm pesticide prices last season as well. However, farm herbicide prices last Spring were down 4 percent from a year earlier while insecticide prices were up 8 percent. Contributing to the herbicide price decline was the continuing drop in the price of atrazine, down 7 percent and a substantial cut in the price of trifluralin, off 10 percent from a year earlier. Atrazine prices are reportedly off a few percentage points again for next season.

Herbicide use grew dramatically in the 1960's and the early 1970's but has grown at a slower rate since 1976. Herbicide use on major field and forage crops increased at a rate of 3 percent a year between 1976 and 1982, compared to 14 percent a year between 1971 and 1976. The slow-down in the herbicide growth rate is attributed to the high proportion of acres treated by the mid-1970's and the common practice of using multiple treatments.

Use of insecticides actually dropped about 45 percent between 1976 and 1982 in terms of pounds of active ingredients applied. This drastic decline is largely attributed to the widespread substitution of synthetic pyrethroids for traditional chemicals in cotton insect control. The pyrethroids are used at one-tenth or less the rate of the older materials.

Growth in the use of herbicides has been leveling off in recent years and overall growth rates will probably continue to decline. The mix of materials will also continue to change as more post-emergent herbicides are introduced and conservation tillage continues to gain acceptance. Quantities of insecticide used may decline further as synthetic pyrethroids used at even lower rates are introduced and improved management and better application methods reduce the need for chemical insect control.



Table 1--Acres of selected crops, 1982, 1983, and projected 1984

Crop	:	:	:	Percent change	
	:	:	:	:	:
	:	:	:	:	:
	:	:	:	:	:
	1982	1983	1982-83	Projected	1983-84
<hr/>					
--- <u>Million acres</u> ---			--- <u>Percent</u> ---		
Corn	81.9	60.1	-27	37-43	
Cotton	11.4	8.3	-27	33-43	
Grain sorghum	16.1	11.6	-28	34-42	
Peanuts	1.3	1.4	5	-1 to +1	
Soybeans	72.2	63.3	-11	11-17	
Rice	3.3	2.3	-29	35-45	
Wheat	87.3	76.6	-12	0-5	
Other <u>1/</u>	24.7	32.6	-26	24-30	
Sum	298.2	256.2	-14	11-17	

1/ Barley, oats, tobacco.

Table 2--Fertilizer nutrient consumption year ending June 30

Year	Nitrogen (N)	Phosphate (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)	Total
<hr/>				
<u>Million tons nutrients</u>				
1980	11.4	5.5	6.2	23.1
1981	11.9	5.5	6.3	23.7
1982	11.1	4.8	5.6	21.5
1983				
Estimated	9.2	4.3	4.5	18.0
Projected				
1984	11.1	4.9	5.8	21.8
<hr/>				
<u>Percent change</u>				
1980-81	4	0	2	3
1981-82	- 7	-13	-11	- 9
1982-83	-15	-15	-16	-15
Projected				
1983-84	21	14	29	21

Table 3--Fertilizer prices, 1980-83 and projected 1984

Year	Anhydrous ammonia (82% N)	Triple Super-phosphate: (44-46% P <sub>2</sub> O <sub>5</sub> )	Diammonium phosphate (18-46-0)	Potash (60% K <sub>2</sub> O)
<u>Dollars per ton</u>				
1980 (May)	234	251	298	135
1981 (May)	247	249	283	155
1982:				
May	255	228	262	155
October	236	216	251	146
1983:				
May	237	214	249	143
October	226	205	238	128
<u>Percent change</u>				
1980-81	6	-1	-5	15
1981-82	3	-8	-7	-8
1982-83	-7	-6	-5	-2
Projected 1983-84	10 to 12	6 to 8	8 to 10	5 to 7

Table 4--Fertilizer supplies, 1981/82 - 1982/83 and projected 1983/84

Item	Nutrients		Change	
	1981/82	1982-83 Estimated	1982/83	1983-84 Projected
<u>Million tons</u>		<u>Percent</u>		
Nitrogen (N)				
Production	14.53	11.32	-22	10
Imports	2.52	2.72	8	15
Exports	2.50	2.00	-20	-10
Net supplies	16.40	14.11	-14	11
Agricultural Use	11.10	9.20	-17	18
Phosphate (P <sub>2</sub> O <sub>5</sub> )				
Production	8.77	9.45	8	8
Imports	.20	.13	-33	- 0
Exports	3.74	3.91	5	10
Net supplies	6.14	6.35	- 3	8
Agricultural Use	4.80	4.30	-20	20
Potash (K <sub>2</sub> O)				
Production	2.16	1.81	-16	0
Imports	4.90	4.51	- 8	17
Exports	.62	.63	2	0
Net supplies	6.79	6.25	- 8	17
Agricultural Use	5.60	4.50	-20	21

Table 5--Changes in pesticide expenditures and prices, 1980-1983  
and projected 1984

Year	Expenditures		Average Price	
	Amount	Change	Index	Change
	<u>Billion Dollars</u>	<u>Percent</u>	<u>Index</u>	<u>Percent</u>
1980	3.1	---	100	---
1981	3.5	13	112	12
1982	3.5	0	115	3
1983	3.0	-14	115	0
1984 <sup>P</sup>	3.5 - 4.0	20	116	1
Projected 1983-84	---	16	---	16

Table 6--Projected pesticide supplies, 1983-84 1/

Type of pesticide	Production	Inventories	Exports	Net supply	Inventory Carryover Percent of 1983 supplies
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Production 1983 Million Pounds

Herbicides	549	212	116	645	---
Insecticides	188	79	66	201	---
Fungicides	53	13	18	48	---
All pesticides	790	304	200	894	

----Percent change 1983/84----

					<u>Percent</u>
Herbicides	-18	32	5	-6	43
Insecticides	10	9	17	7	40
Fungicides	2	23	6	6	31
All pesticides	-10	26	9	-2	42

--- = Not applicable.

1/ Based on September 1983 survey of basic pesticide production.



Table 7--Pesticide production capacity utilization

Year	Production as proportion of capacity			
				All
	Herbicides	Insecticides	Fungicides	Pesticides
<u>Percent</u>				
1975-80	74-92	74-87	77-93	80-86
1981	74	72	68	73
1982	84	68	70	80
1983	66	33	71	54
Projected 1984	54	35	76	47

Table 8--Pesticide prices for 1982-83 and projected 1983-84

	:		
	:		
	:		
	:	<u>Price change</u>	
Type	:	:	
of	:	:	Projected
pesticide	:	1982-83 <u>1/</u>	1983-84 <u>2/</u>
	:	:	
<hr/>			
		<u>Percent</u>	
Herbicides	-4		<u>3/</u>
Insecticides	8		1
Fungicides	3		<u>3/</u>
All pesticides	0		1

1/ Weighted average prices paid by farmers.2/ Reported by manufacturers.3/ Less than one percent.

Table 9--Changes in pesticide use on major field and forage crops  
1966-1982

Year	Herbicides			Insecticides		
	Quantity (a.i.)	Annual change		Quantity (a.i.)	Annual Percent change	
	<u>Million pounds</u>	<u>Percent</u>		<u>Million pounds</u>	<u>Percent</u>	
1966	100	---		131	---	
1971	207	14		126	-4	
1976	374	14		130	3	
1982	451	3		70	-46	
1966-1982	---	10		---	-47	

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## ABSTRACT

This paper reviews the current world fertilizer situation, the supply/demand and balances over the next five years and fertilizer demand for the next ten years. The world fertilizer industry is suffering one of its worst recessions ever, with stagnant demand since 1980 resulting in excess capacity which is likely to last for several years. However the demand for fertilizer is expected to increase as the world economic situation improves. Overall, world total nutrient demand is expected to increase on average by about 4.0% per annum over the next ten years from its depressed situation in 1982/83. In the developing economies the forecast annual growth rate is 5.7%, in the developed economies 3.2% and in the centrally planned economies 3.7%. The nitrogen industry will be dominated by Eastern Europe where excess capacity and export potential will reach nearly 5 million tons of nitrogen. The USA will continue to remain the main exporter of processed phosphate but the move to vertical integration in the phosphate industry in other areas will increase with more than 90% of new phosphoric acid capacity being built near the mines mainly in North Africa and the Middle East. There will be no significant change in the structure of the potash industry with Canada and Russia consolidating their position as leaders.

## INTRODUCTION

Anyone attempting to review the fertilizer situation over the next ten years faces a very difficult task. After a period of tremendous growth in the industry between 1960 and 1980 when fertilizer nutrient consumption and production increased more than fourfold from 28 million tons to 115 million tons, for the last three years the international fertilizer industry has been suffering its worst crisis ever. During a period when producers had expected and planned production to meet what appeared to be a reasonable growth in consumption based on previous trends, fertilizer demand growth rates suddenly regressed and the industry now finds itself with considerable excess capacity in all three nutrients, and prices have fallen to very low distress levels. A depressed world economy with high interest rates has seriously affected the agricultural industry and in many major demand areas such as the developed economies of North America and Western Europe farmers' incomes have declined sharply, resulting in reduced fertilizer purchases. For many developing countries the high value of the US dollar has limited their ability to purchase fertilizer materials. Despite the regression in growth of fertilizer demand, generally harvests have been bountiful which has also depressed agricultural prices.

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The fact that there are some major changes occurring in the structure of the industry, makes it even more difficult to review its future.

Although the industry appears to be showing some signs of recovery in recent months, particularly in the United States where agricultural prices are rising following poor harvest prospects for 1983, overall worldwide recovery is expected to be slow as the continuing balance of payments for developing countries limits their ability to purchase fertilizers according to their needs.

Nevertheless the long-term future of the industry is assured if it is to continue to feed the growing world population. The supply/demand balances and some of the structural changes likely to take place in the industry are discussed below.

#### WORLD BANK/FAO/UNIDO FERTILIZER WORKING GROUP

The supply demand balances presented in this report were prepared by the WORLD BANK/FAO/UNIDO "Fertilizer Working Group." The Group maintains an extensive database for all three nutrients and meets twice a year to maintain this. Fertilizer analysts from different regions of the world attend these meetings and exchange views on the factors affecting world and regional fertilizer supply/demand and balances.

The capacity figures are calculated on a country by country basis and supply capability takes into account the phasing in of new plants, average country utilization rates and distribution and processing losses. Demand figures are agreed by consensus within the group after taking into account a variety of methodology including trend projections, market surveys, agricultural programs and for the large demand countries, econometric modelling.

#### NITROGEN

##### Current Situation

The world supply demand and balances for nitrogen are shown in Table 1. Compared with 1980/81 there was virtually no change in 1981/82 for world nitrogen consumption which remained static at about 60.5 million tons. In the developed countries as a whole, consumption fell from 23.0 to 22.3 million tons, the developing market economies' consumption increased from 12.0 to 12.8 million tons and consumption in the centrally planned economies fell slightly from 25.6 to 25.4 million tons of nitrogen.



Table 1. World Nitrogen Supply Demand Balances - Million Tons N

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1992/93
Available Supply	62.4	67.5	70.7	74.8	74.8	75.7	--
Demand	61.4	63.7	67.0	71.8	72.8	74.2	89.1
Balance	1.0	3.8	3.7	3.0	2.0	1.5	--

Very little growth is expected in world nitrogen consumption in 1982/83. An increase of about 6% is expected in 1982/83 in the developing market economies and about 5% in the centrally planned economies but this will be offset by a fall of about 7.5% in the developed countries due partly to the Payment-In-Kind (P.I.K.) program in the USA.

On the supply side, the stagnation in consumption has resulted in an over-capacity of about 3-4 million tons and the worst impact of this has been felt in the USA. Faced with very low import prices and a low domestic demand exacerbated by the P.I.K. program, more than 3 million tons of ammonia capacity has been idled and it is expected that almost one third of this will remain closed. The greatest nitrogen surplus is in Eastern Europe particularly the USSR where there is about 4 million tons of N excess capacity. Most of this material is exported.

The excess capacity and the apparent willingness of Eastern European producers to sell at any price to obtain hard currency has depressed nitrogen prices to extremely low levels. In May 1983 bagged urea prices FOB Eastern Europe were in the range \$115-120/ton. Taking into account that the total variable costs other than energy are about \$20/ton and that about 35 million BTU are required to make one ton of urea, even if the capital charge on the product is ignored the energy price in the urea is still less than \$3.0 per million BTU. It is not possible for producers who are having to buy gas at energy prices equivalent to oil to compete with these prices even in their domestic markets.

#### Future Outlook

As shown in Table 1 there would appear to be more than an adequate supply of nitrogen to meet demand for the next few years. World nitrogen consumption is expected to pick up in 1983/84 and to increase on average at just under 4% through 1987/88. Over the following five years until 1992/93, demand is forecast to increase on average at about 3.7%. Most of this demand will occur in developing countries where average growth between 1982/83 and 1992/93 is expected to be about 5.6% whereas in the developed countries the average growth rate is expected to be about 3.5% from its depressed level in 1982/83. Centrally planned economies are forecast to grow at about 3.0% due mainly to the low growth rate in China.

On the supply side in the developed economies, apart from some new plants in Canada, very little new capacity will come on-stream. The uncertainty of future gas prices and low cost overseas competition, and the fact that many plants are already idle makes future investment in new capacity in the short term unlikely, particularly in the USA. The USA is already a net importer of ammonia and will become more and more dependent on imported nitrogen in the next few years.

Because of increasing domestic natural gas prices, Western Europe will also become more and more dependent on imported nitrogen to meet its needs, particularly from Eastern Europe.

In the developing countries the most important growth area, both with regard to consumption and supply capability will be the Far East and about five million tons of new capacity scheduled to come on-stream within the next five years will limit the overall deficit for the region to about 1.5 million tons.

In the centrally planned economies the greatest growth will be in Eastern Europe, where although demand will increase significantly it will be outpaced by new supply capability, increasing the region's export potential to nearly 5 million tons. China has indicated that its relatively high nitrogen consumption will grow only slowly in the future (about 2-2.5% per annum) and priority will be given to bringing the other nutrients up to satisfactory levels of application.

Although the world should have no problems in meeting nitrogen fertilizer requirements within the next few years, the situation after that is uncertain and certain issues deserve further comment.

The major one relates to the cost of energy for ammonia and urea plants. As natural gas is expected to remain the dominant feedstock for nitrogen plants for many years, those countries endowed with gas at low economic prices will have a competitive advantage in nitrogen fertilizer production. Although there are several countries in the world where this will be so, the two main areas are the Middle East and Eastern Europe (mainly the USSR). Russia has already recognized this opportunity and has built more than 40 new large ammonia plants over the last few years. These plants which are now steadily coming on-stream have made Eastern Europe the largest producer and exporter of nitrogen as can be seen in Table 2.

Table 2. Projected Regional Nitrogen Balances--Million Tons N

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
<u>Developed Market Economies</u>	0.33	1.99	1.42	1.08	0.47	-0.07
North America	0.49	2.05	1.18	0.98	0.73	0.47
Western Europe	-0.04	0.13	0.52	0.34	0.00	-0.25
Oceania	-0.09	-0.09	-0.05	-0.03	-0.02	-0.03
Other Developed M.E.	-0.03	-0.10	-0.23	-0.21	-0.23	-0.26
<u>Developing Market Economies</u>	-2.59	-2.53	-2.21	-1.69	-1.60	-1.82
Africa	-0.55	-0.60	-0.60	-0.52	-0.58	-0.56
Latin America	-0.10	0.08	0.33	0.38	0.35	0.21
Near East	-0.21	-0.11	-0.05	-0.05	-0.03	0.02
Far East	-1.73	-1.90	-1.89	-1.50	-1.34	-1.49
<u>Centrally Planned Economies</u>	3.25	4.32	4.54	4.43	4.02	3.38
Socialist Asia	-1.69	-1.67	-1.85	-1.89	-2.01	-2.13
USSR	3.40	4.35	4.89	4.69	4.46	4.12
East Europe	1.54	1.64	1.50	1.63	1.57	1.39
<u>World</u>	0.99	3.78	3.75	3.82	2.99	1.49

After 1988/89 the world will show a nitrogen deficit as increasing demand will outweigh new production. Thereafter nearly 4 million tons of ammonia capacity will be required each year equivalent to about 15 new plants to meet new demand. In addition, capacity will also be needed to replace worn-out plants.

At the present however the developed countries, in a depressed situation and with uncertain but rising gas prices see little prospects of future investment. On the other hand some of the wealthy gas-rich countries in the Middle East who appear to be also well placed for the expanding markets in the Far East show little inclination to expand their activities in this field. The very large investments together with the major task of planning and implementing these projects will be a major constraint for the poorer developed countries who may have the potential resources to produce nitrogen fertilizers for exports. With large reserves of gas, a rapidly expanding ammonia capacity and a need to export to earn hard currencies, the USSR will press hard to dominate the international nitrogen market even further. Obviously with a change in the world balances from a surplus to a deficit situation this could have serious implications for the market economies.

## PHOSPHATE

### Current Situation

The world supply demand situation is shown in Table 3.

Table 3. World Phosphate Supply Demand Balances - Million Tons P<sub>2</sub>O<sub>5</sub>

	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>	<u>1992/93</u>
Available Supply	35.7	37.2	38.2	39.0	39.9	41.0	--
Demand	30.9	32.5	34.1	35.5	36.8	38.2	45.6
Balance	4.8	4.7	4.1	3.5	3.1	2.8	--

World phosphate consumption in 1981/82 was 30.9 million tons compared with 31.5 million tons the previous year - a fall of 2%.

In 1981/82 the developed market economies showed an overall decline in consumption of about 6% which followed a 6% fall in the previous year. The most severely hit was the USA where demand fell by about 10% and Western Europe which fell by 6%. The developing market economies also fell in 1981/82 by nearly 6% after growing steadily for many years. The centrally planned economies which were not so affected by the recession in the world economy showed an increase in consumption in 1981/82 of about 5% following the 7% increase of the previous year.

Overall world consumption for 1982/83 is likely to be the same as for 1981/82. The developed economies will once more fall about 6% due mainly to the effect of the P.I.K. program in the USA which will reduce phosphate demand there by about 10%. Consumption in Western Europe will remain about the same, but consumption in the developing market economies is expected to increase by about 2-3% and in the centrally planned economies by about 5% in 1982/83.

The recession in the world phosphate industry has particularly hit the USA which has 50% of the world phosphate processing capacity and about 55% of international processed phosphate trade. Several phosphate plants in the USA are currently closed down and others are working at low rates as the price of phosphates is barely sufficient for many producers to cover their variable operating costs.

#### Future Outlook

Unfortunately as shown in Table 3 the future outlook for the phosphate industry is rather bleak and excess supply could persist through the next five years even though demand is expected to average about 4% through 1987/88 after recovering from the P.I.K. program and other adverse factors.



Table 4. Projected Regional Phosphate Balances - Million Tons P<sub>2</sub>O<sub>5</sub>

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
<u>Developed Market Economies</u>	7.07	6.85	6.16	5.59	5.16	4.80
North America	6.02	6.02	5.56	5.21	5.03	4.93
Western Europe	0.15	-0.04	-0.21	-0.34	-0.49	-0.65
Oceania	0.30	0.29	0.26	0.22	0.17	0.11
Other Developed M.E.	0.60	0.58	0.54	0.50	0.45	0.41
<u>Developing Market Economies</u>	-0.65	-0.55	-0.57	-0.56	-0.55	-0.47
Africa	1.31	1.44	1.60	1.82	2.11	2.50
Latin America	-0.62	-0.70	-0.79	-0.82	-0.95	-1.17
Near East	-0.25	0.00	0.06	0.02	-0.10	-0.23
Far East	-1.09	-1.29	-1.44	-1.57	-1.61	-1.58
<u>Centrally Planned Economies</u>	-1.65	-1.55	-1.51	-1.48	-1.48	-1.48
Socialist Asia	-0.43	-0.51	-0.52	-0.52	-0.52	-0.48
East Europe and USSR	-1.22	-1.04	-0.99	-0.96	-0.96	-1.00
<u>World</u>	4.77	4.75	4.08	3.50	3.13	2.85

Developing countries show the most promising prospects for the next ten years with growth at about 6% per annum compared with 3% in the centrally planned economies. It is expected for the first five years after 1982/83 phosphate demand in developed economies will increase at about 4% per annum from its depressed base but between 1987/88-1992/93 the average growth rate will be about 2%.

Although the forecasts indicate about six years before a balanced situation is reached again, in practice this could be advanced by a year or two as older plants or uneconomic plants affected by changing trade patterns are closed, particularly in Europe and Japan.

The next few years are almost certain to see the trend to vertical integration of the phosphate industry increase as producers in non-resource based countries find it cheaper to buy processed phosphates than process rock themselves. It is estimated that more than 90% of new phosphoric acid capacity either under construction or being planned will be near a phosphate mine. Trade in processed phosphate has increased rapidly in recent years compared with phosphate rock exports. In 1965 about 15% of all phosphate trade was as processed phosphate, by 1980 it had doubled to 30% and by about 1992 it will be 50%.

## POTASH

### Current Situation

The world supply demand and balances for potash are shown in Table 5.

Table 5. World Supply Demand for Potash - Million Tons K<sub>2</sub>O

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1992/93
Available Supply	26.8	27.0	27.9	29.1	30.5	31.0	--
Demand	23.8	25.1	26.3	27.6	28.6	29.7	34.8
Balance	3.0	1.9	1.6	1.5	1.9	1.3	--

In 1981/82 world potash consumption was 23.93 million tons of K<sub>2</sub>O compared with 24.26 million tons in 1980/81 and 23.97 million tons in 1979/80. In 1981/82 compared with the previous year potash fell by 5.7% in the developed economies, 12.5% in the developing economies but increased by 8.5% in the centrally planned economies.

No significant change in world potash consumption is expected in 1982/83. In the developed countries potash consumption is expected to fall about 5% due mainly to the effect of the P.I.K. program in the USA. In the developing and centrally planned economies increases of 5% and 2.5% are expected respectively.

### Future Outlook

On average over the next ten years, potash is expected to increase world-wide at an annual growth rate of about 3.9%. In the developed countries growth will be about 3%, in the developing countries 5.6% and in the centrally planned economies 4.2%. The regional balances for potash are given below in Table 6.

Table 6. Regional Balances for Potash - Million Tons K<sub>2</sub>O

	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
<u>Developed Market Economies</u>	4.52	3.74	3.53	3.37	3.96	3.76
North America	4.39	3.86	3.68	3.57	4.33	4.25
Western Europe	0.19	0.01	-0.07	-0.19	-0.34	-0.44
Oceania	-0.25	-0.26	-0.26	-0.27	-0.28	-0.29
Other Developed M.E.	0.19	0.13	0.18	0.26	0.25	0.24
<u>Developing Market Economies</u>	-3.06	-3.12	-3.31	-3.38	-3.56	-3.70
Africa	-0.28	-0.30	-0.32	-0.34	-0.36	-0.38
Latin America	-1.43	-1.54	-1.70	-1.74	-1.86	-1.93
Near East	0.05	0.21	0.30	0.38	0.44	0.47
Far East	-1.40	-1.49	-1.59	-1.68	-1.78	-1.86
<u>Centrally Planned Economies</u>	1.55	1.29	1.39	1.55	1.52	1.29
Socialist Asia	-0.68	-0.79	-0.84	-0.90	-0.96	-1.02
Eastern Europe and USSR	2.23	2.08	2.23	2.46	2.48	2.31
<u>World</u>	3.01	1.91	1.61	1.53	1.91	1.34

The supply side for potash is probably much easier to predict than for the other two major nutrients. Major reserves of potash are limited to a few countries or regions and it seems likely that most future developments will take place in these areas.

The main developments will occur in Canada and the USSR. In the face of lower than anticipated demands some plans for new capacity in Canada have been delayed but even so, supply capability is expected to increase from about 8 million tons in 1982/83 to 9.8 million tons in 1987/88. About 0.8 million tons of this will be in New Brunswick.

At the present time the USSR is the world's largest potash producing country with about 8.6 million tons of supply capability in 1982/83. The country has ambitious plans to expand its industry further to nearly 11.0 million tons by 1987/88 to meet growing internal demand and to expand exports. These exceed the reduced expansion plans of Canada but much will depend on whether or not the Russians can overcome the production delays and low operating efficiencies which have plagued its potash industry in the past.

It seems highly unlikely that there will be any major developments elsewhere that will change the current structure of the industry or have any major impact on world trade before 1990. In Brazil a potash mine will come on-stream in Sergipe after 1985 with a capacity of about 0.5 million tons per year of  $K_2O$ . Possibilities are being examined elsewhere, for example in Thailand, Mexico, Tunisia, Chile, Peru, Ethiopia, in the Amazon area of Brazil and in China. Most of these will be small projects if they materialize, at least initially and are unlikely to have any significant impact on the overall scene during the 1980's.

The potash industry in both West Europe and Canada has shown considerable discipline in limiting over-production. In 1981/82 due to restricted working in order to reduce stocks, consumption exceeded production. The potential surplus capacity at about 3 million tons will decline over the next three or four years and by 1987/88 should approach a balanced situation depending on the situation in the USSR. Hopefully the reduction in the potash surplus balances should be reflected in future prices for potash.

## CONCLUSION

The world fertilizer industry has grown very rapidly in the last three decades and the structure of the industry has also changed as both demand and production in the developing and centrally planned economies have increased at a more rapid rate than the developed economies. This trend will continue through the next decade and largely as a result of this, the proportion of production capacity in the public domain will also increase steadily to about two-thirds by 1992.

Although there appears to be adequate supply capability for the next few years, by 1988, or perhaps before, supply/demand should once again be balanced but after that time considerable new capacity and investment will be required each year to meet increasing demand.

On the other hand, the move to vertical integration in the phosphate industry seems likely to accelerate as rock producers seek to exploit its economic advantages and dominate the industry.

There will be no significant change in structure in the potash industry with Canada and Russia consolidating their position as leaders.

#### ACKNOWLEDGEMENT

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From economic considerations, new nitrogen capacity should go where the natural gas is cheap and plentiful; for example, the Middle East but constraints on project development in this area and on other potential exporters in developing countries will probably inhibit this trend.



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1984 Agricultural Outlook Conference  
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Good Morning.

My remarks today focus on three aspects of the international outlook for pesticides. First, I'll discuss the economic outlook in terms of agriculture and inputs. Second, I'll review the technological outlook, with emphasis on what is happening in research and some of the problems faced in developing new technology. Third, I'll briefly discuss the political outlook, encompassing both economic and technological dimensions.

Underpinning my comments about the world outlook for pesticides are three key assumptions. They've been stated so many times that they sound trite, but that does not diminish their importance.

One assumption is that millions of people suffer from some form of malnutrition. No one, including the Food and Agriculture Organization of the United Nations, has more than a good guess at what the precise number may be. In 1979, a commission on world hunger appointed by President Carter estimated that 1 in 8 people suffers from malnutrition. Whatever the real number is, it's clear that while enough food is produced to feed all people currently living, it's equally true that only a relatively small portion of the world's people have enough food to represent an adequately balanced diet.

A second assumption is that world population growth will continue to pressure agricultural production as well as stimulate it. Norman Borlaug has pointed out that the world population will grow to between 5 and 5.5 billion people by 1990, and will reach 8 billion by 2040 at the latest, and 2020 at the earliest. That represents a doubling of the world's current population -- and the consequent demand for food -- in 40 to 60 years.

Our third assumption is that the land under cultivation cannot be significantly increased, at least in the near term. Research in biotechnology and gene-splicing may succeed in

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expanding the kinds of land and climates in which we can grow food crops, but this research will not yield results until the turn of the century at the earliest. Thus, in the near term, the forces driving us toward more productive agriculture, that is, to increase crop yields for each acre now under cultivation, will continue unabated.

It is with these assumptions in mind that we'll discuss the world outlook for pesticides.

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First, let's look at the economic outlook for pesticides. In 1981, the world market value of agrichemicals reached \$13 billion. That's equivalent to roughly 2.5 billion pounds of insecticide, fungicide and herbicide active ingredients. Last year, this value grew in real terms by about 4 percent to \$13.5 billion. It should reach about \$14 billion this year. Alan Woodburn of Wood, MacKenzie has projected that revenues will reach about \$20 billion, in 1982 dollars, by 1990. That represents a growth rate of about 4-5 percent per annum. This is consistent with recent years' growth but below the rapid growth of the late 1960s and early 1970s. The higher growth rates, of course, were driven by the comparatively rapid assimilation of high-technology agrichemicals by the U.S. and European markets -- markets characterized by highly-educated farmers, excellent communications, sophisticated distribution systems, and the like.

This growth projection is based upon a number of factors. Real prices of the main agricultural commodities should increase at fairly slow rates, barring extremes of weather or geopolitical disruptions. More importantly, this growth is due to the fact that an increasing number of the so-called newly industrialized countries and less developed countries appear to be reordering their economic development priorities.

Agricultural development, which in the past has been given short shrift compared to industrial development, is now again being recognized as the vital driving force in these countries economies. Examples are India, Brazil, Thailand, Indonesia, Argentina and Mexico -- all with varying degrees of commitment and execution.

Virtually all of these countries have underutilized arable land, and they hold the potential to become important agricultural markets during the next decade. Whether this occurs, of course, depends on their skill and commitment in stimulating local farmers to increase agricultural investment, such as land, equipment, fertilizer, hybrid seeds, pesticides and the like.

Critical here is the pricing level of agricultural commodities, the means used to establish price, as well as the government commitment to invest in agricultural infrastructure over an extended period of time. Also significant are the technological inputs made available to the farmer -- both on the

farm and in colleges and universities -- as well as through local extension agencies.

Countries with this heightened awareness are recognizing that bringing new acres into production is no longer an option. Virtually all available arable land is now under cultivation. To increase productivity, these countries must accelerate adoption and use of the so-called high technology inputs. They are becoming convinced that pesticides put money into farmers' pockets and foreign exchange balances. Herbicides, for example, should yield farmers an average of two to five times the value spent in purchases.

This represents a very significant trend in countries which have viewed pesticides as a cost -- or who were concerned that pesticides displace agricultural labor.

Overhanging this side of the equation, of course, are persistent problems of inflation, foreign exchange, and the extremely serious debt situation in many Third World countries. According to Morgan Guaranty, Third World debt grew from about \$100 billion in 1970 to more than \$600 billion in 1981. Debt service alone reached more than \$100 billion in 1981.

Third World debt brings new dimensions to doing business in overseas markets. It certainly has contributed to growing Third World demands for increased local investment, regardless of whether or not the local market merits such investment. Negative balances of trade experienced by the industrializing countries -- not an unexpected phenomenon as they import machinery and materials needed to industrialize -- is stimulating these countries to pressure multinationals to add value locally. I'll discuss these two areas -- overseas market expansion and local investment -- in more detail shortly.

The final aspect of the economic outlook concerns harvests, and here the big story -- quite obviously -- is what happened in the United States this year. It appears that a combination of PIK and the drought has made a significant dent in U.S. crop surpluses. However, it should be stressed that good weather conditions and farmer expectations next year could quickly bring the United States right back to where it was at the end of 1982. By using high agricultural technology, U.S. farmers have enormous productive capacity -- and obviously require free access to large, ex-U.S. markets. With the world's expanding population, improving per capita income and expected long gestation for less developed countries to absorb high technology, we also expect strong markets for U.S. crop exports in the foreseeable future.

In summary, the economic outlook calls for continued slow, steady growth that could be stimulated by improvements in the Third World agricultural structural framework.



In the near term, the technological outlook for pesticides should be similar to our experience in the past several years.

Total industry spending on research and development is about 7.5 percent of sales, according to Wood, MacKenzie. Much of this investment, particularly since the late 1960s, is being focused increasingly on ongoing R&D programs as opposed to more "innovative" types of research. This trend can be explained by declining profit margins over the past decade -- in part due to the increasing costs to introduce a new product. Introduction of a single product, on average, will have close to \$70 million in development costs. When the costs of manufacturing facilities are included, this reaches a total of \$100 million. And these are outlays made before any sales are generated.

Concerning the acceptability and use of pesticides, as one would expect -- they are much more prevalent in the developed countries. For example, the United States, Europe and Japan, last year, accounted for roughly 70 percent of the total worldwide pesticide market. While we expect the higher growth rates will continue in other parts of the world, the United States, Western Europe and Japan by 1990 will still account for about 66 percent of the total market.

Part of the reason for this can be attributed to the economic and structural problems endemic in many Third World countries. For, until they are able to solve at least part of their debt problems and expand their local economies, they can be expected to encounter problems in securing and paying for modern agricultural technology. Another problem of considerable magnitude concerns the difficulties encountered in many nations in introducing and achieving widespread adoption of new agricultural cultural practices -- and the need to undertake extensive training and educational programs to show local farmers what agricultural technology can provide. Also, one must recognize the wide disparities in the efficiency of marketing, distribution, harvesting, shipment and storage systems in the United States and those in less developed countries -- inefficiencies which quite obviously severely penalize local farmers.

In summarizing the technological outlook, Third World countries may hold the key to their own economic improvement by stimulating agricultural education and technology. Changes in crop pricing mechanisms, for example, should spur production.

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A third problem that is economic, technological and ultimately political concerns property rights -- and this brings us to the political outlook for pesticides. There is a growing concern in the agrichemical industry, and other industries as well, that there is a widespread misunderstanding of the nature of such basic property rights as patents and research and product test data. We are concerned this misunderstanding could



lead to a considerable restriction in the thus far reasonably smooth flow of technology into Third World nations.

It is axiomatic that nations having the greatest industrial property rights protection also happen to be those nations which are the most highly developed. Those of us who reside in the United States, or in Western Europe and Japan, can understand the connection between a strong system that protects property rights and a high level of technological innovation.

In many Third World nations, however, property rights such as patents are often viewed as relics of colonialism -- in effect, barriers to Third World economic development -- rather than a stimulant of development. Any agrichemical company that wants to do business in the Third World has to grapple with this fact of life, dealing with it at the national level there, and at international levels in such groups as the Food and Agriculture Organization and in meetings such as those held last year and early this year on the Paris Convention.

One common problem in many developing nations is their desire to define the "working of a patent" as local manufacture. In other words, economic progress is equated with smokestacks. Yet, in the case of agrichemicals, the value to a particular nation is not in a manufacturing plant -- rather, it is the value to the nation's agriculture in boosting productivity and agricultural exports. In fact, one could argue quite persuasively that economic interests of local farmers are not served by policies which stimulate construction of small, less efficient agrichemical manufacturing facilities. If duties were lowered and patent working requirements removed, local farmers could then gain access to world-scale manufacturing economies.

Confronted with such "beggar-thy-neighbor" policies, Monsanto, for example, has been forced to adopt a policy of locating manufacturing and formulating facilities outside the United States. In 1975, we had five such ex-U.S. manufacturing facilities. Today we have manufacturing investments in some 14 countries outside the United States.

Most of these facilities are first constructed as formulation units -- the final step in the product manufacturing chain. Local market conditions can most often support these types of facilities.

But even with larger, more fully integrated manufacturing plants, the presumed benefits of employment are simply not there, in the context of a developing nation's economy. Agrichemical manufacturing plants are capital-intensive, not labor-intensive, and thus make a negligible contribution at best to a country's employment problems. The real value of pesticides by far, is the value to the country's local agricultural productivity.

Local manufacturing is only one aspect of the problem of property rights. Perhaps even more serious is the likelihood that the lack of an adequate system of patents and other rights will preclude the best and most recent technology from being employed in a particular country. No company is willing to risk a product that involves up-front costs of \$100 million in a country where property rights protection is weak or non-existent. What's more, prudent, hard-nosed management of research and product development resources in a highly unpredictable environment requires a "rifle-shot" approach in selecting your ultimate markets. Virtually every major agrichemical company has had serious problems with product pirates. These problems will continue to hamper use of agricultural technology until stronger protection of property rights is forthcoming.

International property rights protection is only one aspect of the political outlook for pesticides. Another is the pressing need for the United States to develop a long-term agricultural policy that is global in scope and encompasses both the need to further improve the quality of productivity and to assure our maintaining a strong share of the overseas agricultural market expansion.

PIK has been expensive, but it has had several benefits, not the least of which is the growing recognition of and sharpened focus on the importance of agriculture to the American economy. It is quite clear that past gains in agricultural productivity and technology have, in effect, globalized U. S. agriculture.

It appears that this need for a comprehensive national agricultural policy in an increasingly interdependent world is becoming well recognized. For example, this was a major topic of concern at a meeting last month of the Midwest Governors Conference. Let me conclude by saying that all of us in agriculture have the responsibility to see that this awareness continues, and that we work toward a consensus on what such a long-term policy should encompass. I believe that the creation of such a policy will do much to further brighten the prospects of the international outlook for pesticides.

-oOo-



Weather has had a major impact on agriculture this year, beginning with the cold, wet spring in California, a late frost in the Southeast, and followed by the severe drought this summer. Much attention has been focussed on the effect of the weather on food prices. While the weather has an important influence on food consumption and prices, it is not the only determinant. Prices are also influenced by the trend on food processing and distribution costs and the strength of consumer demand.

Today I will discuss the probable affect of the drought as well as these two other factors on food prices and consumption next year. First, I will discuss food price trends the past several years and the factors responsible for the substantial food price moderation. Next, I will review the impact of this year's drought on current and future crop and livestock supplies. Finally, I will bring these factors together in our forecast for food prices and consumption for next year.

#### Recent Trends in Food Prices

In recent years food price increases have trended downward. Since 1979, when food prices rose nearly 11 percent, prices have risen at successively lower rates each year. This year, food prices will rise about 2 percent, marking the smallest increase since 1967. It also will be the eighth year of the last nine years that food prices have risen less than the general inflation rate.

Table 1--Food Price Indicators

Consumer price index category	Changes from previous year					
	1979	1980	1981	1982	1983p	1984f
Food	10.9	8.6	7.9	4.0	2.2	4 - 7
Food away from home	11.2	9.9	9.0	5.3	4.4	4 - 7
Food at home	10.8	8.0	7.3	3.4	1.1	3 - 6

p=preliminary f=forecast

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The food marketing cost index (MCI) measures changes in prices of the principal food marketing inputs including labor, packaging, transportation, and fuel and power. In the first 8 months of this year, the total MCI was 2.6 percent above the same period last year. This compares with an increase of over 5 percent in 1982, and 11 percent in 1981.

About 50 percent of marketing costs are comprised of direct labor costs. With the decrease in the general inflation rate and the recession, increases in labor costs have been more moderate. Labor contract settlements in the food industry have included smaller wage and benefit increases, and in some instances, decreases in wages and benefits. Cost-of-living increases in existing labor contracts have also been smaller, again reflecting smaller increases in the general inflation rate. Additionally, the minimum wage has not increased in the last several years. The labor component of the marketing cost index is expected to rise 3 percent this year after having risen 11 percent two years ago.

Packaging, transportation, fuel and power, and the many other miscellaneous components of marketing costs have risen at a combined rate of 1 percent this year. A slow rate of economic recovery has held down demand for packaging materials, and prices have averaged slightly below levels of last year. Transportation rates have also risen very little this year, reflecting still weak demand for transportation and lower diesel fuel costs. Lower petroleum prices have moderated the rise in prices of electricity but prices of natural gas, the major type of energy used in food processing, have averaged about 20 percent higher this year.

In 1984, food marketing costs are expected to rise at near this year's moderate rate. Many labor contracts of workers employed in food processing and retailing provide for wage increases in the range of 4 to 5 percent next year. Some meat packer contracts hold wages constant through the end of the year. There is no indication of a rise in the minimum wage for next year which covers a large number of the workers in the food service establishments. However, the cost of social security insurance will increase on January 1, putting some upward pressure on labor costs. As the economic recovery gains strength, other components of the MCI are likely to increase along with the general rate of inflation, but the labor component, accounting for 50 percent of food marketing costs, will dampen the the overall increase in the MCI.

Table 3--Major Food Marketing Costs

Category	Change from previous year			
	1981	1982	1983 p	1984 f
				<u>Percent</u>
Food Marketing Costs	11	5	3	4 - 7
Labor	10	7	4	3 - 6
Packaging	7	-2	0	3 - 6
Fuel and Power	19	5	1	5 - 8
Transportation	16	7	1	3 - 6

p=preliminary f=forecast

## Weather Conditions in 1983

The year 1983 started with what appeared to be a relatively mild winter. Prospects were bright for large vegetable supplies. The outlook for meat production was slightly stronger, death losses of newborn pigs were held down due to mild winter weather, and weight gains of cattle and hogs were better than usual for this time of year. Although winter temperatures remained above normal, heavy rain storms developed, damaging many winter vegetable crops in California and Florida.

The rainy weather continued well into the spring, delaying planting of many crops. Ample soil moisture, however, helped the winter wheat crop develop. Cattle marketings in the spring were disrupted by muddy feedlot conditions and the resulting poor weight gains. Temperatures remained cool, retarding development of those crops that were planted. Late frosts damaged peach and apple crops in the Southeast. Warmer weather did finally arrive, and prospects for crops brightened. Although somewhat behind schedule, spring plantings were completed and the outlook for most crops looked good because of ample soil moisture.

In late July, hot, dry weather set in over much of the Midwest and the Southeast. Temperatures averaged well above normal in those areas and dry conditions continued, putting stress on corn and other feed grains, and soybeans at the crucial stage of development when rain is needed to aid in pollination. Hot, dry weather continued into September, resulting in the worst drought in 50 years in the affected areas. As a result of the drought, as well as smaller plantings, this fall's harvest of corn and soybeans, the principal feeds for livestock, will be 40 to 50 percent smaller than last year. The impact of the drought on feed grains was moderated by large carry-over stocks from the record crops of the previous two years. A few other crops suffered from the drought including the peanut crop which is likely to fall about 15 percent. Again, winter wheat was an exception, benefitting from the weather--the drought occurred at harvest, resulting in record yields. The drought did not affect the major fruit and vegetable growing areas and most supplies recovered from the wet spring.

The primary affect of the drought thus far has been on livestock feed costs, pushing them higher. However, higher feed costs do not directly translate into higher retail meat prices. Rather, changes in feed costs prompt livestock and poultry producers to change production plans. When the outlook is for high feed grain prices, such as during the drought, producers tend to reduce animal inventories, which increases slaughter and causes higher meat supplies. Therefore, the initial effect is lower retail prices because of the temporary increase in meat supplies. As supplies eventually dwindle, however, retail prices begin to rise. Furthermore when farmers rebuild breeding herds by holding animals off the market, meat supplies fall even lower, putting further upward pressure on prices.

## 1983 and 1984 Outlook for Food Prices

Having described some of the underlying economic trends of the last few years, and the 1983 weather pattern, we can now see what is happening to retail prices of foods this year and what we might expect to happen in 1984.

As I have mentioned earlier, the increase in food prices this year will be the lowest in 16 years. Next year, however, food price increases will be higher. Expected stronger economic conditions are the reason for most of the increase. Real disposable personal income is expected to increase next year by

about 3 percent. Although that may seem modest, it is the strongest increase in recent years. Consumers might be willing to buy more food, and could possibly be willing to buy higher priced foods, particularly meats. This year's drought will also have an affect on meat prices in the second half of the year, adding about 1 to 1.5 percentage points to the increase in the CPI for food. Overall, the CPI for foods in 1984 is expected to rise between 4 and 7 percent. Most of the increase will occur in the second half of the year, with strong increases in the third quarter, particularly in meats.

### Meats

Meats prices in 1983 will average lower than in 1982. The primary reason for lower meat prices is higher pork production this year, after the strong production cutbacks last year. Pork prices have declined each quarter this year and are presently about 12 percent below their levels of a year ago. The decision to increase pork production in 1983 was due to strong hog prices and expected lower feed prices resulting from the record corn harvest last year. The mild winter temperatures were also conducive to larger pig crops, and better weight gains, keeping market supplies of hogs large. The drought however, brought higher feed prices and some liquidation of hog breeding stock which contributed to the larger pork supplies and lower prices this fall. Beef and veal prices have been relatively stable this year. Beef prices increased somewhat in the second quarter, mainly due to reduced marketings during the abnormally cold, wet period. Some liquidation of breeding stock occurred because of the drought and higher feed prices. This has added to beef supplies this fall, keeping beef prices from rising. During the rest of the year, meat supplies are expected to remain abundant.

Retail meat prices will increase in 1984 as the record large supplies of this fall begin to dwindle. Because of the liquidation from the 1983 drought, there will be fewer animals to be marketed in 1984. The strongest affect of this production cutback will probably occur about mid year. Retail meat prices, therefore, are expected to rise sharply in the third quarter, and level off somewhat in the fourth quarter. Retail pork prices will rise the most. Meat prices will be sharply higher than a year earlier by the end of the year.

### Poultry and Eggs

Poultry prices were relatively stable in the first half of this year. Supplies were ample, partly because of lower export demand. Broiler producers, however, can react to market conditions rapidly because of the short maturation period required for chickens. Facing higher feed costs and already slim profits, broiler producers slowed production, and retail prices rose sharply in the third quarter of this year. The CPI for poultry is currently about 4 percent above the 1982 level.

In 1984, poultry prices are expected to continue to rise. Little change in retail poultry prices are expected in the first quarter, however, sharp increases can be expected in the second and third quarters as demand shifts from relatively higher priced red meats to chicken. Broiler production will likely increase as producers respond to the stronger demand.

The CPI for eggs has risen steadily this year after having fallen nearly 3 percent last year. Production adjustments were made after producers experienced loss of export markets last year. Supplies have been smaller this year, putting upward pressure on prices. Egg prices are expected to fall some in the first two quarters of 1984 but will rise again in the last half of the year.



## Dairy Products

Retail prices of dairy products have risen slightly over 1 percent this year. The small increase is attributed to marketing costs. The support price has remained unchanged from \$13.10 per hundred weight this year, thus keeping the farm value of dairy products virtually unchanged. Free distribution of processed dairy products, particularly cheese, has also helped to hold down retail prices this year.

Prices for dairy products are expected to rise very little through most of 1984. However, under current legislation, the price support level is scheduled to rise in the fourth quarter and retail prices of dairy products will likely reflect this increase.

## Fish and Seafood

The CPI for fish and seafood has followed a normal pattern in 1983 and for the year rose about 1 percent. The winter quarter shows a strong increase in retail prices, but as weather improves in the spring and summer, supplies usually increase, bringing retail prices down. In the fourth quarter, retail prices begin to rise again as supplies begin to wane.

The 1984 increase in retail prices of fish and seafood might be larger than this year's increase but the quarterly pattern of price change will likely be similar. Consumer demand could possibly be stronger for fish and seafood in the second half of the year as consumers shift away from higher priced beef and pork. If this is the case, price levels would remain higher than otherwise expected.

## Fats and Oils

Large supplies of soybean oil earlier this year kept the CPI for fats and oils very near year earlier levels. The drought however, hurt soybean production and prices for products using vegetable oils have increased in recent months, particularly margarine and cooking oils. While the CPI for fats and oils is expected to increase, the effect on the overall food CPI will be limited because of the low weight this component has in the total. Along with lower soybean production, eastern peanuts were also damaged by the drought, lowering peanut production this year by about 15 percent. As a result, some increases might be seen in peanut butter prices.

In 1984, retail prices for fats and oils will increase as a result of lower soybean oil stocks. Stocks were at record high levels this year however, and as a result prices are expected to rise moderately. Prices for fats and oils in 1984 are expected to average about 5 percent above their 1983 levels.

## Fruits and Vegetables

The winter rains caused retail prices of vegetables to rise sharply in the first half of this year, but as warmer weather arrived, vegetable supplies increased and prices fell sharply. Fresh vegetable prices will average only a little over 2 percent above the 1982 level. Processed vegetables have increased less than 1 percent this year. Large stocks of frozen vegetables, and weak consumer demand has kept processed vegetable prices very near the 1982 levels. Large supplies of apples and oranges have held down the CPI for fresh fruits this year. Rains in California damaged some of the peach crop, but most summer fruits weathered the storms well with good yields and moderate prices. The



summer drought did not effect the major fruit growing aress. Fresh fruit prices are expected to average 2 to 3 percent below 1982 levels.

In 1984, the CPI for fruits and vegetables is expected to rise 4 to 7 percent. Vegetable prices will rise the most. Much of the increase in vegetable prices will result from the smaller potato harvest this year. Strong demand is also expected for fresh vegetables, putting upward pressure on retail prices. Fruit prices will also increase next year. A smaller California orange crop and a smaller apple crop are expected to put upward pressure on fresh fruit prices. Price increases for processed fruits will likely be moderated by large supplies of frozen orange juice. Barring a January freeze, the Florida orange crop promises near record yields.

Table 4--Changes in Food Price Indicators, 1981 through 1984

	1981	1982	1983	1984
				Forecast
<u>Consumer Prices Indexes:</u>			<u>Percent</u>	
All food	7.9	4.0	2.2	4 - 7
Food away from home	9.0	5.3	4.4	4 - 7
Food at home	7.3	3.4	1.1	3 - 6
Meat, poultry, and fish	4.1	4.0	-0.4	4 - 7
Meats	3.6	4.8	-0.1	4 - 7
Beef and veal	0.9	1.4	-0.5	4 - 7
Pork	9.3	12.9	-1.2	3 - 6
Poultry	4.1	-1.8	1.3	4 - 7
Fish and seafood	8.3	3.6	1.1	2 - 5
Eggs	8.3	-2.8	1.3	4 - 7
Dairy products	7.1	1.4	1.3	2 - 5
Fats and oils	10.7	-2.8	0	4 - 7
Fruits and vegetables	12.0	5.5	.5	4 - 7
Sugar and sweets	7.9	-0.2	2.1	4 - 7
Cereals and bakery products	10.0	4.5	3.2	4 - 7
Nonalcoholic beverages	4.2	2.8	1.9	2 - 5

#### Sugar and Sweets

The CPI for sugar and sweets has risen about 2 percent this year. Prices for sugar have been stable this year due to the import quota and fee system which protects domestic producers from the influence of very low world prices. The sugar support price increase will put some upward pressure on sugar prices next year, but the increase is expected to be moderate.

#### Cereals and Bakery Products

Price rises of cereals and bakery products have slowed this year, reflecting the slowdown in rising food marketing costs. Also, large stocks of food grains have kept the farm value of cereals and bakery products low. The farm value of these products, however, amount to only about 12 percent of the retail cost. Therefore, changes in marketing costs have a far greater influence on retail prices than do changes in farm prices. Cereals and bakery products are expected to rise about 3 percent this year, very near the general inflation rate.

The CPI for cereals and bakery products will likely rise in 1984. Stronger economic conditions and higher marketing costs will be the main reasons for the price increase. Farm prices for food grains will also be higher, but higher grain prices will account for a small amount of the higher retail prices.

### Nonalcoholic Beverages

Nonalcoholic beverage prices this year have increased about 2 percent. Most of the increase was in the first quarter, followed by declines in both the second and third quarters. Most of this increase can be attributed to marketing costs. Retail prices for coffee have declined slightly so far this year, reflecting ample world supplies of coffee. Soft drink prices have also been steady for most of the year, reflecting only slight increases in sugar prices, and substitution of high fructose corn sweeteners.

In 1984, nonalcoholic beverage prices will rise moderately. Most of the increase will be due to higher marketing costs. World supplies of coffee are expected to be ample as weather conditions have been favorable in coffee growing countries. Soft drink prices will also rise, partly due to higher marketing costs and partly due to an increase in sugar supports. Keen competition among soft drink bottlers, however, will tend to dampen price increases somewhat.

### Per Capita Food Consumption

Per capita food consumption (on a retail-weight basis) in 1983 is estimated to be about 1 percent more than in 1982. The sluggish consumer food demand in 1982 was the result of little or no growth in real personal income. Demand for food is expected to rise in 1984 as real personal disposable income increases. Per capita food consumption, however, is expected to fall. This seems contradictory, but food supplies will be smaller, primarily the result of the decreased meat production.

Table 5--Food Consumption, Retail Weight, 1981-1984

Food category	1981	1982	1983p	1984f
	<u>Pounds per person</u>			
Total food	1,396	1,385	1,399	1,396
Animal products	582	574	585	577
Red meats	157	151	157	150
Beef & veal	79	79	80	76
Pork	65	59	63	61
Other	13	13	14	13
Poultry	63	64	65	66
Eggs	34	33	34	33
Dairy products	304	302	305	303
Other	24	24	24	25
Crop products	814	811	814	819
Cereal & bakery	151	150	151	150
Vegetable oils	48	49	50	47
Fruits & melons	163	156	164	163
Vegetables	283	287	280	288
Sugar & sweets	135	134	134	135
Other	34	35	35	36

Consumption of animal products foods will likely increased about 11 pounds per person in 1983. Consumption of pork will increased the most reflecting larger supplies. Beef and poultry consumption will increase modestly. Dairy consumption will also increase because of larger supplies and the free distribution of cheese from government stocks.

In 1984, consumption of animal products is expected to fall. This will be mainly due to the expected cutback in red meat production resulting from the 1983 drought. Poultry consumption will likely increase as consumers substitute chicken and turkey for red meats. Overall, consumption of animal product foods is expected to fall 1.4 percent.

Per capita consumption of crop products has risen modestly in 1983. The largest increase has been for fruits and melons. This has been primarily due to the large apple crop in the fall of 1982 and the large orange crop this year in both Florida and California. Vegetable consumption has dropped, however, due to short supplies earlier in the year. It is likely that consumption of home garden vegetables was also down because of the cold, wet spring and the summer drought.

Consumption of crop product foods is expected to be higher in 1984. With normal weather, vegetable consumption will likely recover, and be responsible for the increase. Consumption of fruits may drop slightly due to the expected smaller 1984 orange crop in California. Vegetable oil consumption may also drop because of this year's poor soybean crop resulting from the drought. Consumption of all crop product foods is expected to rise less than 1 percent in 1984.

#### Summary

Large supplies of farm foods, weak consumer demand and weak foreign demand have moderated food price increases in the last few years. The 1983 food price increase of slightly over 2 percent will be the smallest increase in 16 years.

In 1984, food prices will average 4 to 7 percent above 1983 prices. Further increases in marketing costs, a moderate rise in prices of farm commodities and stronger consumer demand, prompted by higher real disposable personal income, are the primary reasons for the increase. The 1983 drought is responsible for about 1.0 to 1.5 percentage points of the increase. While the drought's impact on the yearly increase in food prices is relatively small, most of the increase in prices will come out at one time--in the summer and fall of 1984. Early in the year, food prices will rise at a relatively slow rate but prices--particularly meat prices--are expected to go up sharply from July to September when the adjustment in livestock production due to the drought reduces beef and pork supplies. Relatively low prices moving into 1984 and higher prices at the end of 1984 will make the change during the year 2 to 3 percentage points larger than the 4 to 7 percent annual average change.



Ellen Haas, Executive Director  
Public Voice for Food and Health Policy

1984 Agricultural Outlook Conference, Session #31  
Washington, D.C.

For Release: Wednesday, November 2, 1983

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Good morning; I enjoy being back before the Outlook Conference to provide a consumers perspective on food price and consumption in 1984. I have spoken to this conference several times. I remember giving the consumer response in 1979, a year in which food prices rose by double digit rates. Since that time, as we have learned, food price increases have fortunately been far more moderate. I guess the first conclusion I would draw is that it takes a good strong dose of inflation to get the Department to put us on the program.

While there may seem to be no relation between these events, in truth there is. There is no question that when food prices rise or are projected to rise, policy makers and members of the industry become highly concerned about what consumers think and what they are going to do. Yet it is supremely ironic that what causes such concern in the long run is of precious little concern when the policies that cause, or at least risk, the inflationary impact are being formulated.

This morning we have heard that while over the short term higher feed prices will encourage animal producers to reduce animal inventories, thereby increasing slaughter and meat supplies--putting a downward pressure on retail meat prices, the chickens will come home to roost, so to speak, later next year. As meat supplies are reduced, and then farmers deliberately hold animals off the market to rebuild cattle herds, meat supplies will rebound downward, exerting a strong upward pressure on meat prices.

Our speaker has suggested that overall food prices will rise between four and seven percent next year over this year, with the bulk of that increase coming from higher meat prices. Most of that increase will occur for pork and the greatest impact will be felt in the third quarter. I certainly hope consumers take advantage of the good price opportunities available today!

We have heard that this increase is the result of a severe drought which has cut production of corn and soybeans primarily used for animal feed, by 40-50 percent. But we should not overlook the fact that another key reason for reduced production--and for the higher prices consumers will next year pay--are the policies adopted by the U.S. government.

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It is ironic that an Administration which came to power pledging to reduce federal expenditure and to get government out of the nation's business has put into effect one of the most expensive and interventionist farm programs in history. Yet this is what has happened in the form of the Payment in Kind or PIK, program and it is what is aggravating the effects of the drought and its impact on consumers and the general economy.

The PIK program has been criticized for a number of reasons--including the fact that it will benefit mainly larger farmers with the greatest acreage under production historically--especially because the Administration chose not to apply the traditional \$50,000 payment limitation to the program. In addition, many have expressed great concern that the conservation goal of the program would not be reached. Policing compliance is another problem, but the big criticism of the program is cost--largely to provide the payments in kind required by the PIK program, a total bill of over \$20 billion is expected to be paid by the U.S. taxpayer.

While the consumer price increases expected next year can not be blamed on PIK; there is no doubt that by reducing production and drastically drawing down federal grain reserves, prices will be boosted next year and we will be placed in an extremely vulnerable position for future years. If, for example, we should have a repeat performance for the weather next year I don't see how we could ever expect to get out of the economic mess caused as a result, with anything less than double digit food price inflation.

It is the lack of planning for the possibility of drought that bothers me most; in its eagerness to build farmer participation, the Administration built sizable incentives into the program and agreed to pay corn farmers 80 percent of their average yield and wheat farmers 95 percent. This generosity with publicly-owned grain reserves has led to an excessive idling of land and an unnecessarily large give-away of grain and it has placed us in a very vulnerable position for the future.

Unfortunately, the dye is cast for food price impact from PIK and other federal programs for 1984; as far as that program goes there does not appear to be too great a use for a continuation into next year simply because the stocks aren't there to permit it. But in other areas, are there actions that the government could take to reduce the pressure of food price inflation for this year and next?

The answer most certainly is yes. Especially in the areas of dairy and sugar could the Administration be instrumental in reducing food prices over the coming months.

The dairy program offers perhaps the best opportunity. The program has been running out of control for some time and government purchases of surplus products and the expense of buying such products is staggering. This year taxpayer expenses for the program will exceed \$2.5 billion.

Currently there are two proposals pending to solve or at least diminish the dairy price support problem. One would continue to assess dairy farmers 50¢ for every hundredweight of milk they produce, set up an additional assessment for product promotion purposes, and implement a new PIC program for dairy producers. By PIC I do not mean the term in the way it has been applied to the grain programs--for dairy farmers the acronym would be PIC or "payment in cash"--each farmer would get \$10 for every hundredweight of milk not produced. Again, with no limitation, payments to producers will be greatest for the largest farmers and government checks will reach hundreds of thousands of dollars for many. While some have said that the 50¢ assessment will pay for the diversion, I ask you--where does the assessment come from? It comes from dairy incomes supported through a 2.5 billion dollar support program.

While this proposal would reduce the support price by 50¢ and possibly more in the future, there is another proposal that would cut the price by as much as \$1.50 per hundredweight are likely around \$1. To us this plan is clearly preferable as it would significantly reduce consumer prices and give a substantial boost to milk consumption. In fact, as compared to the other option, the alternative we favor would spare American consumers nearly 4 billion dollars in purchases of dairy products, and lead to an increase in milk consumption of nearly 4 billion pounds--or almost one gallon of milk and one pound of cheese annually per capita.

With respect to sugar, current legislation supports domestic sugar producers at levels 8-10 cents per pound above the world price, and the Administration provides, through duties, fees and quotas on sugar imports, a domestic market price substantially above the loaned rate to insure that sugar producers have a profitable market for their product and thus do not default on their loans. Yet it is widely observed that the price maintained by the Administration is far higher than that necessary to accomplish this objective, and that the "market stabilization price: could be reduced by 3.5 cents if minor Administrative changes were made in the program. These changes would save consumers up to 1 billion dollars annually, but the Administration has refused to consider them seriously.

As the evolution of these policy issues illustrates, consumers have come to realize the great stake they have in agriculture policy. Since the explosive period of food price increases in the 1970's, consumer involvement in the policy debates have grown. In an era of volatility and vulnerability, consumer participation is becoming a critical component in the decision-making process. As we face the prospects of steep price increases in the second half of 1984, it will become necessary for Congress and the Administration to address the consumer perspective in the process. Only if this happens will it be possible to bring balance to the policies and stabilize food prices and budget costs.

Peter C. Myers, Chief, Soil Conservation Service

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The outlook for increased attention by farmers and ranchers to soil and water conservation is more encouraging today than it has been for several years.

First, there is strong support for the aims of conservation. President Reagan and Secretary Block are firmly committed to implementation of USDA's National Program for Soil and Water Conservation, which was sent to Congress by the President last December. Congress also has demonstrated strong support for soil and water conservation programs, both through the level of appropriations and new legislative proposals.

Second, the Soil Conservation Service and other USDA agencies concerned with conservation have already taken a number of significant actions to carry out the National Conservation Program, most of them in close cooperation with local conservation districts. More actions are planned in the near future.

Third, agricultural researchers are developing more cost-effective farming methods that result in good crop yields while at the same time protecting soil and water resources. SCS and other agencies and groups are working together to get reliable information to land users about application of these new methods, which include innovations in conservation tillage and no-till.

The net result, we believe, will be measurable gains in the continuing battle against soil erosion, waste of agricultural water, and upstream flooding.

These changes in direction and emphasis are called for in the Department's National Conservation Program, which was developed over several years to comply with the Soil and Water Resources Conservation Act of 1977, or RCA. In passing that Act, the Congress made it clear that fresh approaches were needed in USDA's various soil conservation programs, several of which are nearly 50 years old today.

Despite much conservation progress since the Dust Bowl days of 1935, many resource problems remain. About one-third of our cropland is eroding at rates that reduce its long-term productivity. More than one-half of our nonfederal grazing land is producing at less than 50 percent of its potential. In parts of the West and Great Plains, ground water is being pumped from aquifers faster than they are being naturally replenished.

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In responding to these problems, the new program sets national objectives and priorities, focuses assistance in areas with critical resource problems, and strengthens the partnership of Federal, state, and local agencies and private organizations. It also aims to make the most progress possible for each dollar spent for resource management by making USDA conservation efforts more effective.

### National Objectives

As part of the program, USDA has adopted six long-term objectives:

- **Reduce excessive soil erosion** by helping landowners apply and maintain conservation systems on nonfederal agricultural lands that are now eroding excessively, and by helping them maintain systems on lands now adequately protected.
- **Improve irrigation efficiency** by increasing the efficiency of onfarm water use and of conveyance systems.
- **Improve water management** by supporting states that modernize water-rights laws and increasing the reliability of agricultural water supplies.
- **Reduce upstream flood damage** through structural and nonstructural methods--with the emphasis on nonstructural methods.
- **Improve range condition** by reducing excessive erosion and emphasizing rangeland management systems.
- **Improve water quality** by applying knowledge gained through determining the relationship between soil erosion and water pollution and through evaluating alternative ways to reduce nonpoint source water pollution.

### Program Priorities and Concerns

Not every long-term objective can receive high priority in the short term. Therefore, the program establishes--for the first time--national priorities to guide USDA conservation activities for the years 1983 through 1987.

The first priority is to reduce excessive soil erosion on crop, range, pasture, and forest lands. The second priority is twofold: to conserve water used in agriculture and to reduce flood damage in upstream areas.

While USDA's efforts will be governed by national priorities, the program recognizes the need for flexibility around the country. USDA will continue to assist state and local governments in dealing with other problems of local consequence. These problems are called "concerns" to distinguish them from "priorities" and are:



1. Improvement of range, pasture, and forest lands;
2. Improvement of water quality;
3. Conservation and development of natural resources in urban areas and rural communities;
4. Improvement of fish and wildlife habitat; and
5. Management of organic wastes from livestock.

#### Redirecting USDA Conservation Activities

Redirection is the core of the program. It means simply that USDA will spend a greater share of its conservation budget on the three national priorities. In 1981, USDA directed about 54 percent of its soil and water conservation funds to the three national priorities and 46 percent to all other soil and water conservation activities. By 1987, USDA will direct 67 percent of its soil and water conservation funds to the national priorities, leaving 33 percent for all other soil and water conservation activities. SCS and other USDA agencies already had made substantial progress toward achieving the Department's goal of redirection by the end of 1983.

The most important step toward achieving redirection is the targeting of additional Federal assistance to areas with critical resource problems.

Targeting will make USDA's programs more effective because the most severe resource problems are concentrated in relatively small areas. Many farms in these areas experience annual soil erosion losses far above levels than can be replaced through natural processes of regeneration.

Losses of this magnitude eventually will lower productivity, if they have not already done so. Targeting is designed to accelerate conservation treatment where excessive soil erosion, water shortages, or upstream flooding threaten long-term agricultural productivity. A targeted area receives extra technical and financial assistance from SCS and ASCS to control or significantly reduce the soil or water problem.

In FY 1982, areas in 15 states were targeted; in 1983, areas in 31 states received additional assistance. Areas in 45 states are scheduled to receive targeted funds in 1984. As critical problems are solved in one area, funds will be shifted to another area where erosion or water problems are serious.

The total amount of conservation technical assistance targeted by SCS in 1983 was \$12.5 million; by ASCS, \$19 million. SCS will target \$26.3 million in conservation technical assistance in 1984. In 1985, 15 percent of SCS conservation technical assistance funds will be targeted.

There is clear evidence that targeting is achieving its aims. Through FY 1982, soil erosion on cropland in targeted areas was reduced by about 13 million tons, and more than 700 thousand acres of excessively eroding cropland were treated to conservation standards. In the arid West, irrigation farmers in targeted areas saved 150,000 acre-feet of water through accelerated improvements in water conservation. At press time, targeting accomplishments for FY 1983 were being reported. Early indications were that targeted areas made substantial gains in their fight against erosion and water waste.

In 8 counties in Western Kentucky--a typical targeted area--all FY 1983 goals for erosion reduction were exceeded. Demonstrations and other efforts are selling more farmers on conservation tillage. In one county, about 2,500 acres of wheat and some 60 percent of the corn and soybeans are now planted with conservation tillage, and prospects are good for a total no-till rotation. ASCS provided \$261,250 in targeted financial assistance to the 8-county area, and 30 more long-term agreements were contracted with farmers in 1983, for a cumulative total of 64 LTA's on 4,315 acres.

SCS is also targeting in the small watershed program under Public Law 566. Targeted funds are going for new construction and for planning new projects in areas that have experienced unusually costly flood damage. Also, the small watershed program is emphasizing priority needs, like erosion control. Further, SCS has decided that 25 percent of small watershed construction funds will go for cost-sharing on projects that contain no major structural measures, like dams. Some reduction in flood peaks can be achieved by applying sound conservation practices on upland slopes, increasing the infiltration rate of rainfall, and slowing storm water runoff to the valleys below.

While SCS and ASCS are redirecting their programs through targeting and in other ways, other improvements in conservation programs are taking place in the Agricultural Research Service, Cooperative State Research Service, Economic Research Service, Extension Service, and Forest Service. These agencies are increasing their research, information, and education activities that address priority resource problems in the areas targeted by SCS and ASCS.

Where soil and water resource conditions are adequate for sustained productivity, the Department will continue to help landowners maintain their conservation systems through technical assistance, cost sharing, and other services.

#### Strengthening the Conservation Partnership

The National Conservation Program will strengthen the role of existing local agencies and organizations: Conservation programs developed at local and state levels will form the basis for activities carried out through the national program.

USDA will encourage conservation districts to develop local programs in cooperation with county Agricultural Stabilization and Conservation committees, Extension advisory committees, and other local groups and individuals. These programs will establish objectives, identify critical problems and areas, and set priorities for action. State agencies can consider the local programs in preparing a state program as authorized by state law. The Department will consider the state programs in updating the national program.

## Promoting Cost-Effective Conservation

Another key feature of the National Conservation Program is a concerted effort to get farmers and ranchers to make greater use of conservation tillage and other cost-effective conservation measures that control erosion at reasonable cost.

One way to do this is by proving to farmers that conservation tillage, including no-till, may cost less than conventional tillage. A computer program designed to show farmers the relative costs of various types of tillage, singly and in combination with other conservation measures, will soon be available in any SCS office where there is a computer terminal. Developed for SCS under contract with the University of Illinois, the SOILEC program will also show a farmer the estimated sheet and rill erosion rates for a particular soil under different management systems. It will also show the cost of each compared to conventional tillage. SCS hopes that SOILEC printouts will help demonstrate that on most soils, conservation tillage is more cost-effective than conventional tillage and that no-till may be the most cost-effective of all.

The latest research information about conservation tillage is being disseminated by the Conservation Tillage Information Center. The Center has both public and private sponsors, including the Soil Conservation Service, and it should help shorten the time lag between new research and its application. The Cooperative Extension Service, research agencies, chemical and farm equipment companies, and farm magazines also are helping keep farmers informed about the benefits of conservation tillage. Many observers believe that we are about to experience a sharp increase among farmers in the adoption of the various techniques of conservation tillage...a quantum leap forward. To find out exactly where we stand, SCS is now working with the Center on a National Survey of Conservation Tillage Practices.

SCS is also studying barriers to the adoption of conservation measures by farmers and ranchers. Sociological studies were conducted by and for the agency in 1982-83 to determine ways to achieve more effective adoption and application of existing conservation knowledge.

Social scientists found that economic considerations are not the only obstacles to adoption of conservation systems. While farmers want assurance that recommended conservation measures are cost-effective, they also want to examine more conservation options. Studies also revealed that farmers want more specific information about conservation--and that they are often confused about where to get that information. Further, many farmers simply do not recognize the extent of soil erosion on their land--particularly when the erosion is very gradual, as it often is with sheet and rill erosion.

During the next 2 years, USDA and conservation districts will use the findings of the social scientists to develop more effective information and education programs, including new efforts to bring more peer pressure to bear on farmers who have not yet applied adequate soil and water conservation.

## Improving Program Efficiency

The National Conservation Program aims to make the most progress possible by increasing the effectiveness of USDA efforts. USDA is testing new approaches and making changes in management of existing programs.

Testing Pilot Programs. The National Conservation Program calls for setting up pilot projects to test new approaches for dealing with resource problems. Successful approaches will be expanded or made part of regular Department activities. In 1983, farmers in four counties began to sign up for the first pilot program, to test the conversion of excessively eroding croplands to permanent cover. In return for a cash payment, the farmers agree to plant marginal cropland to grass or trees and to maintain the new cover for at least 10 years. The counties are Pike County, Alabama; Bonneville and Bingham Counties, Idaho, and Stanley County, South Dakota. The local conservation districts are administering the pilot program, with help from SCS and with cooperation of ASCS and other USDA agencies. A total of \$1.5 million in SCS funds is financing the program.

If the pilot program is cost-effective and successful in reducing soil erosion, SCS will consider incorporating the concept into one or more ongoing programs.

Improving Program Management. For better program planning and administration, USDA will:

- . Strengthen interagency cooperation and budget coordination.
- . Increase the use of long-term agreements with landowners so that conservation systems are installed in a timely manner and maintained efficiently.
- . Resolve inconsistencies in various agency programs. The Department will seek to ensure that all agency programs support the conservation objectives. For example, USDA changed the eligibility requirements for some loans from the USDA Farmers Home Administration. An applicant for a farm-ownership loan or soil and water loan now is required to have--or to request--a conservation plan for the land on which the loan is to be used. The applicant is also required to make a commitment to correct serious erosion problems.
- . Strengthen the capability to gather and analyze resource data used in appraising resources, setting priorities, and designing programs.

Other USDA Actions. The National Conservation Program also calls for emphasizing help in installing conservation systems rather than single conservation practices and for a continuation of activities to protect and conserve rangeland and pastureland.



### The Conservation Outlook

USDA believes that the flexible and multi-faceted approach to solving America's resource problems that is set forth in the National Program for Soil and Water Conservation will go a long way toward helping this country slow down resource degradation. The Program directs USDA assistance and financing toward specific priority goals; it is experimental; it is supportive. It seeks to coordinate the work of several USDA agencies concerned with conservation and to increase Federal cooperation with State and local conservation agencies, including the nearly 3,000 soil conservation districts in the United States. The Program not only seeks more cost-effective methods of conservation, but it also calls for more cost-effective government.

In the final analysis, however, if critical resource problems on private lands are going to be brought under control, it is the individual farmer or rancher who must assume most of the responsibility. Various levels of government can help and encourage him to apply conservation, but they cannot and should not manage his soil and water for him. The farmer will have to do that himself, and he will do it only when he is convinced that soil and water conservation makes good economic sense, both in the short run and the long run. In SCS, we think that thousands of farmers are going to find that out during the next two or three years, and that they will become permanent converts to conservation farming.

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Ronald L. Lundine, Raymond P. Motha and Thomas L. Puterbaugh,  
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OUTLOOK '84



1984 Agricultural Outlook Conference, Session #33

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When extreme negative or positive departures from "normal" weather (droughts or floods, respectively) are realized in major agricultural regions, the effects are far reaching with respect to current food supplies and future economic and agricultural decisions. Highly variable weather occurs throughout the world every year; 1983 was no exception as many regions experienced large anomalies in seasonal weather.

The variability of U.S. weather during the past 4 years provides an excellent example of how erratic patterns can be from year to year. In 1980, a prolonged hot and dry period affected a large portion of the Great Plains and western Corn Belt, resulting in substantial yield losses. The following two years were relatively cool and wet and excellent crops were produced. Drought returned in 1983 severely stressing crops and inducing unprecedented yield reductions.

Extended droughts are not always necessary for lowered yield potentials. Many crops can tolerate somewhat unfavorable conditions during vegetative stages without appreciable damage. However, most crops are highly vulnerable to moisture stress even for short periods during the reproductive and early grain-filling stages. Stressful conditions imposed during these critically sensitive periods can have highly adverse effects, just as can those of prolonged dryness. Before summarizing current prospects for the 1984 crop season, a brief review of the 1983 season is presented.

In 1983, a cool, wet spring delayed U.S. cotton, corn, soybean, and sorghum planting in the central and southern states and also slowed winter wheat development as it had the previous year. Once again, a potential was created for critical moisture-sensitive stages of the summer crops to occur later than usual, concurrent with normally hot, dry August weather. The lateness of crop planting also raised concern about a possible early frost and damage to crops before they were fully mature. However, mild weather over the northern Great Plains allowed earlier-than-normal planting and development of spring grains.

During the previous year, mild temperatures and favorable moisture supplies throughout the growing season prevented crop moisture stress and led to record yields. In 1983, conditions changed dramatically after the July 4th

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weekend. High pressure developed over the central United States, and subsequent rising temperatures imposed heat stress on most major corn and soybean areas, although the warm weather was favorable for winter wheat harvesting. As the heat wave continued, drought-like conditions developed in the Central Plains. This parched area expanded to cover all major portions of the Corn Belt, extending farther than the 1980 drought. Soil moisture reserves were depleted rapidly as crops progressed through the reproductive stage. Crop conditions continued to deteriorate during the grain filling period in August and September, further lowering yield potential. Many farmers had to divert intended grain acreage to silage. These limiting environmental factors, in conjunction with curtailed acreage, combined to reduce corn production almost 50 percent below the 1982 record.

Chronic dryness over major Soviet winter wheat areas in the eastern Ukraine and North Caucasus during the fall of 1982 caused poor emergence and early development. One of the mildest winters on record immediately followed and most western USSR winter wheat areas, except for the southern Ukraine and the southern North Caucasus, generally received sufficient spring moisture for early growth. The dry weather in the south continued through April, becoming unfavorable for winter wheat in the vegetative stage as well as slowing germination of spring crops. Timely rains in early May improved growing conditions across the south, but soil moisture remained limited throughout the growing season. As winter wheat was heading and spring crops were emerging in the south, dry weather was limiting yield prospects in the eastern Ukraine, the lower Volga Valley, Black Soils, and North Caucasus. Most crops in the western Ukraine, Belorussia, Baltic States and the Central Region benefited from timely precipitation throughout the season which maintained good yield potential. Moderate rain eased dryness in the south near the end of July and improved conditions for late corn; however, a portion of the early crop already had progressed through the moisture-sensitive tasseling period and some yield losses likely occurred. Dry weather during the late summer and early fall favored maturing crops and aided harvest activities. In the New Lands, the spring grain planting season began with mostly favorable moisture conditions in the north, but southern topsoils were somewhat dry for good germination. Persistent precipitation in the north favored grain through the reproductive and filling stages, but hampered harvest activities. As spring wheat headed in the south and central areas, persistent unseasonably warm, dry weather caused the crop to rely on limited soil moisture reserves to maintain yields. Dry weather aided much of the harvest activity.

Agriculture in India depends basically on the timing, distribution, and intensity of monsoon precipitation. This year, onset of the wet season was 2-3 weeks late, delaying planting of autumn rice, cotton, and groundnuts. However, the following monsoon rains generally persisted in an active phase in central India through much of the remaining season. Cotton and groundnuts entering the reproductive period in western India greatly benefited from earlier, abundant moisture during July and August. This gave crops 2-3 week dry period in September and likely maintain a high yield potential. Rice areas in the east, excluding northern Bihar and Tamil Nadu, received adequate rainfall while in the reproductive and grain filling stages. The ample supply of moisture likely will be reflected in much improved yields with respect to last year's deficient rains and poor crops.



Autumn harvesting is nearing completion in most major Northern Hemisphere agricultural regions and conditions for next year's crops are of current interest. Winter grains are now being planted and moisture is needed for early growth. Subsoils also need to be replenished by winter and spring precipitation. In the Southern Hemisphere, summer crops are being planted and will require an adequate supply of rain. Figure 1. highlights the current agricultural weather situation for the Northern and Southern Hemispheres.

The longterm Palmer Index depicting drought severity for the U.S. is shown in Figure 2. Indicated are regions which are most vulnerable to moisture stress this fall and the coming spring. Moisture reserves are low in western Texas, the mid-eastern region, and along the East Coast. These areas, in particular, will need significant winter and spring precipitation to recharge the soil moisture profile to provide favorable growing conditions for next years crops.

#### NATIONAL SITUATION

Winter Wheat: The southern section of the hard red winter wheat region is currently suffering from spotty, limited precipitation. In Texas, seeding of the 1984 harvested crop has been slowed because of dry topsoils. Some winter wheat has been dusted in, but the dry conditions have delayed emergence. Sowing has progressed at a normal pace in Oklahoma, however, early dryness had held emergence to only half of normal. Recent rains have helped alleviate the dryness. Moisture also is in short supply in most of western Kansas, consequently, seeding and emergence are lagging behind normal. As a result of the below-normal summer rains, substantial winter and spring precipitation will be needed to replenish subsoil moisture. Warm weather is needed to allow sufficient growth before the crops go into dormancy. Northern hard red winter wheat areas in Nebraska, South Dakota, and Montana have nearly completed sowing and are ahead of schedule. Crops are emerging ahead of normal in the north generally rated in good condition, with the exception of some slightly dry areas in western Nebraska.

Most northern areas have adequate moisture supplies, but rains will be needed when the crops begin vigorous spring growth. Soft red winter wheat, predominantly grown in the eastern Corn Belt, mostly is being planted earlier than usual because of the early soybean harvest. Emergence in Illinois was slowed earlier due to dry conditions, but recent rains have improved prospects. Generally, subsoil moisture is low and winter and spring precipitation will be needed to ensure proper growing conditions in 1984. Winter wheat areas in the Northwest are being sown under generally good conditions. Recent dry weather is causing some small areas of unfavorably dry soils, but above normal summer rains have maintained adequate subsoil moisture.

Spring Wheat: Moisture conditions presently are favorable across North and South Dakota and western Minnesota. However, northeastern Montana has had below-normal precipitation and has a limited subsoil moisture supply. Timely spring rains will be required to ensure proper topsoil moisture for sowing.

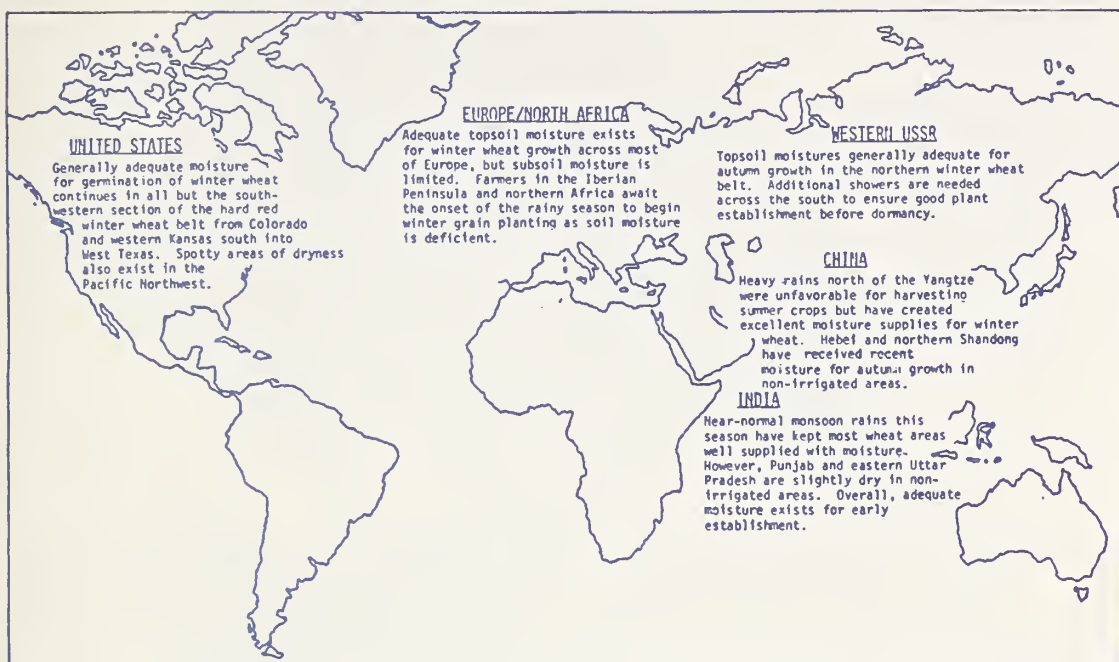
Corn/Soybeans: The hot and dry conditions during the 1983 growing season advanced corn and soybean development ahead of normal. Harvesting activities also are ahead of schedule. Soil moisture is in short supply in nearly all of



# NORTHERN HEMISPHERE

## WORLD AGRICULTURAL WEATHER HIGHLIGHTS

### OCTOBER 19, 1983



# SOUTHERN HEMISPHERE

## WORLD AGRICULTURAL WEATHER HIGHLIGHTS

### OCTOBER 19, 1983

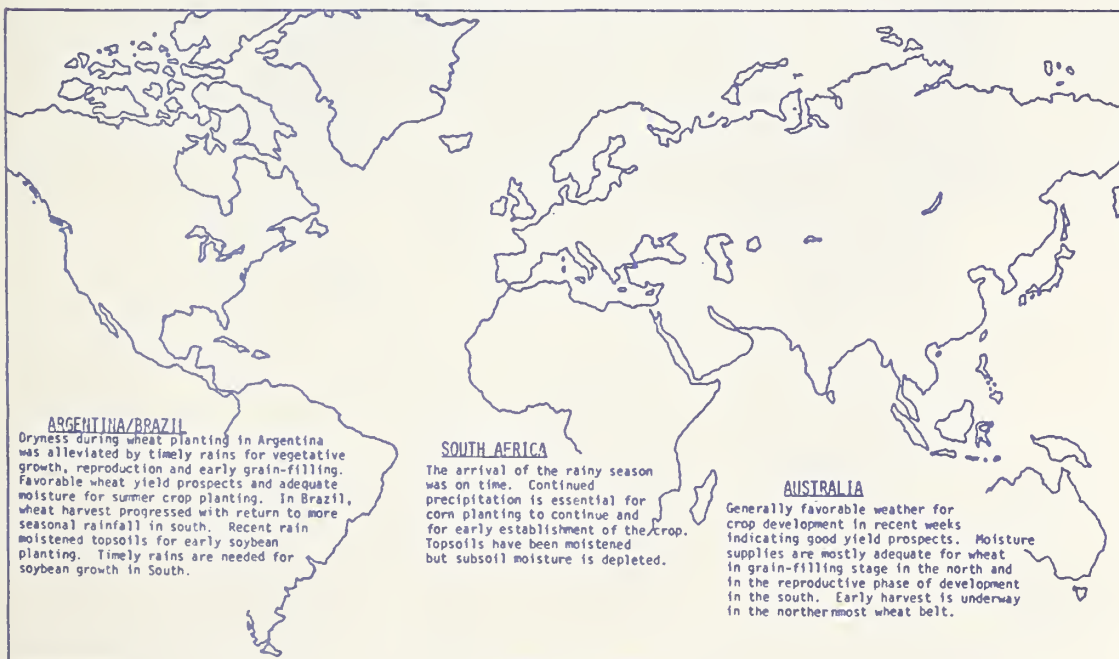
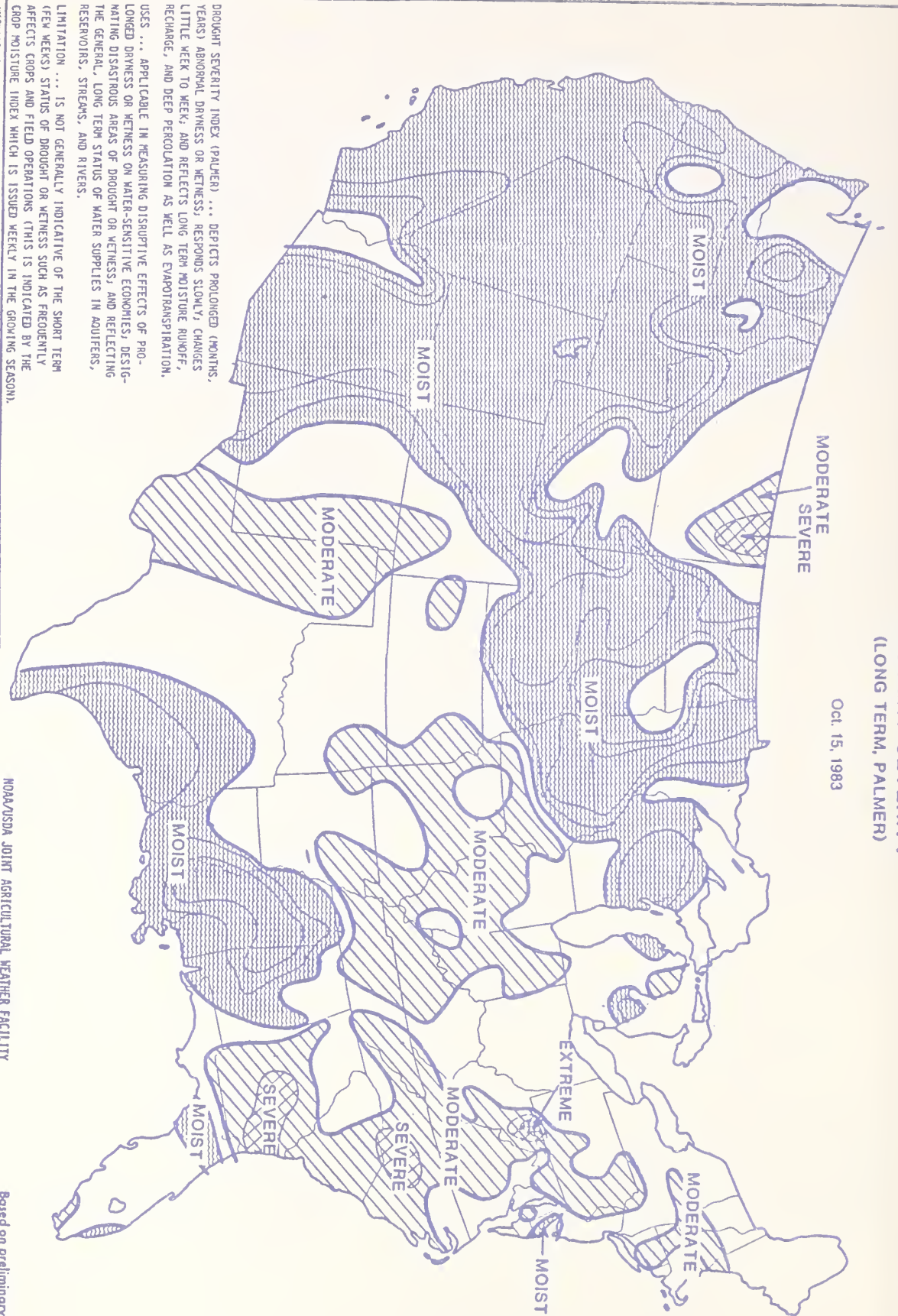


FIGURE 1.

# DROUGHT SEVERITY (LONG TERM, PALMER)

Oct. 15, 1983



DROUGHT SEVERITY INDEX (PALMER) ... DEPICTS PROLONGED (MONTHS, YEARS) ABNORMAL DRYNESS OR WETNESS; RESPONDS SLOWLY, CHANGES LITTLE WEEK TO WEEK, AND REFLECTS LONG TERM MOISTURE RUNOFF, RECHARGE, AND DEEP PERCOLATION AS WELL AS EVAPOTRANSPIRATION.

USES ... APPLICABLE IN MEASURING DISRUPTIVE EFFECTS OF PROLONGED DRYNESS OR WETNESS ON WATER-SENSITIVE ECONOMIES, DESIGNATING DISASTROUS AREAS OF DROUGHT OR WETNESS, AND REFLECTING THE GENERAL, LONG TERM STATUS OF WATER SUPPLIES IN AQUIFERS, RESERVOIRS, STREAMS, AND RIVERS.

LIMITATION ... IS NOT GENERALLY INDICATIVE OF THE SHORT TERM (FEW WEEKS) STATUS OF DROUGHT OR WETNESS SUCH AS FREQUENTLY AFFECTS CROPS AND FIELD OPERATIONS (THIS IS INDICATED BY THE CROP MOISTURE INDEX WHICH IS ISSUED WEEKLY IN THE GROWING SEASON).

NOAA/USDA JOINT AGRICULTURAL WEATHER FACILITY

Based on preliminary reports

W-83-1

FIGURE 2.



the corn/soybean region. Recent precipitation while benefiting establishment of winter wheat, has been inadequate to replenish low soil moisture reserves. Thus, winter and spring precipitation is needed to produce an optimistic outlook for the 1984 growing season.

With the exception of the northern Great Plains and Gulf Coastal Region, the present soil moisture conditions are reducing prospects for optimal early crop growth and development in the United States in 1984. However, the past two springs have been very wet, delaying spring planting. If this situation is repeated next spring, the moisture would greatly improve crop prospects in most areas. Consequently, precipitation during the coming winter and spring will be an important indicator of the 1984 early season crop prospective.

#### INTERNATIONAL SITUATION

(Based on data compiled at the NOAA/USDA Joint Agricultural Weather Facility through October 15, 1983)

USSR: Presently, the outlook for winter grains is good in most of the northern region, but recent below-normal precipitation in parts of the south in creating potential problems for emergence and early establishment. Generous rains in September and early October over the western Ukraine, Black Soils and across the north from the Baltic States to the northern Urals have moistened topsoils and helped to replenish subsoil moisture depleted by summer grown crops. Conditions are less than favorable in the eastern and south-central Ukraine, northern North Caucasus, and southern Volga Valley. Some recent light showers have helped, but dry weather still is a concern as the planting season nears an end. Although winter wheat is a crop that can be sown into fairly dry topsoils and responds to delayed moisture for germination, the period of time for sufficient early establishment before the crop enters dormancy is becoming short. If early growth is stunted, the crop's ability to withstand cold temperatures is reduced and vulnerability to winterkill increased. However, last year's crop escaped significant winterkill due to a very mild winter. More precipitation and warm weather is needed in the south to ensure good early plant establishment. Also, spring precipitation will be required to replenish subsoil moisture. Moisture conditions in the New Lands appear more favorable for 1984 spring grains in the north, but rain will be needed in the south and central areas for spring sowing.

INDIA: The major winter crop is winter wheat, predominantly grown in the north. Planting begins in early October. Nearly one third of the crop is grown in Punjab and Haryana. Up until early September seasonal precipitation accumulations in this area had been adequate. However, from September 11-October 8, only about 12 mm of rain fell in the area. This lack of precipitation, especially in Punjab, combined with seasonably warm temperatures is creating unfavorably dry topsoil conditions for sowing and emergence in nonirrigated areas. This point is evident in Figure 3, which shows the Monthly Drought Index, a standardized precipitation measure developed by Bhalme et. al. (1983 Monthly Weather Review; 111, 86-94) and calculated for 1983 total September precipitation. Driest areas in the wheat region are in the north and include Punjab, eastern Uttar Pradesh, and Bihar. However, these areas have the greatest concentration of irrigated land. Seasonal rainfall in eastern Uttar Pradesh was below normal and summer crops

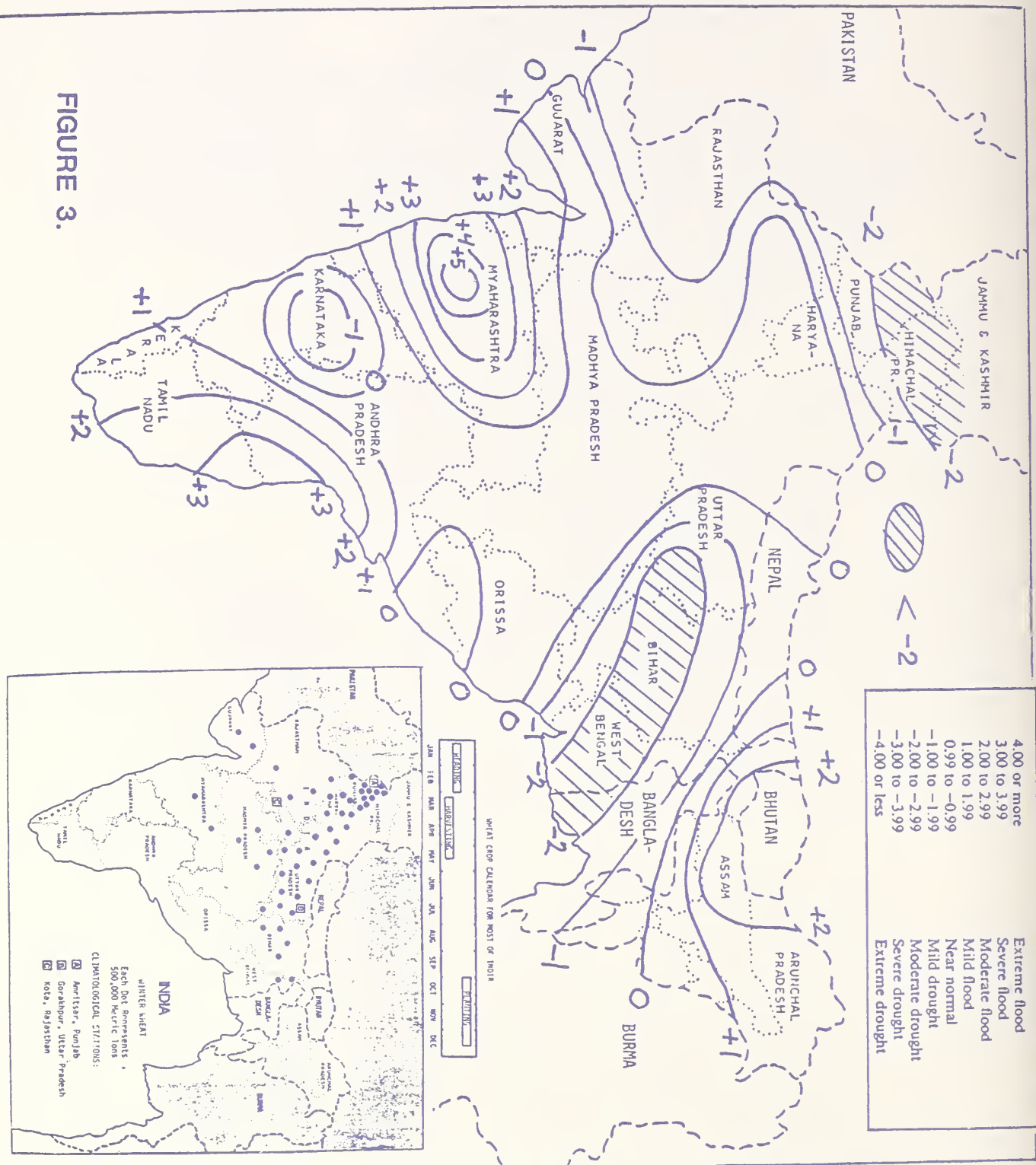


FIGURE 3.



depleted subsurface moisture supplies in nonirrigated areas. Recent moderate rains in the north, albeit less than normal amounts, have improved topsoil conditions somewhat. Southern winter wheat areas in India, including most of Madhya Pradesh, Gujarat, and Maharashtra, have benefited from abundant precipitation during the monsoon season. Conditions for planting and early development in these southern crop areas are generally adequate.

CHINA: Spring moisture was very favorable for most winter wheat areas in the North China Plain. Above normal rainfall resulted in bumper wheat harvests and good planting moisture for summer grown cotton, corn, and soybeans. Excessive precipitation in southern China hampered planting progress of early and intermediate rice. However, June weather was very favorable and allowed drying to occur during early rice maturation. The late, double-cropped rice also was planted late, but temperature and moisture conditions have been adequate in the south where the majority of the crop is grown. A heavy band of precipitation between the Yangtze and the Huang Ho River Valleys was unfavorable for southern cotton, corn, and soybeans during maturation. The precipitation has, however, created very favorable moisture conditions for newly sown and emerging winter wheat. Some planting delays may be occurring in the southern wheat region where localized accumulations have been excessive. Temperatures have remained slightly warm, helping to ease wet conditions and promote early establishment before the crop goes into dormancy. Dry weather had persisted in the northern winter wheat areas of Hebei and northern Shandong, and some planting delays may have occurred in nonirrigated areas. However, recent rains have improved topsoils.

BRAZIL: Extremely heavy rains persisted in Rio Grande do Sul and Santa Catarina throughout the latter phases of the summer grown crops. The precipitation caused flooding, delayed the soybean harvest, reduced yields and lowered the quality of the crop. In the northern crop region, coffee and citrus crops were aided by timely rain during reproductive stages and escaped any freezing temperatures during the winter season. However, early harvesting suffered from periods of heavy rain causing a reduction in crop quality. The heavy downpours also caused wheat planting delays and poor seedling emergence in water-logged fields in Rio Grande do Sul and Santa Catarina. More recent dry weather in southern crop areas has been favorable for wheat maturation and harvest activities. Wet weather in the north has delayed corn and cotton planting somewhat. Earlier persistent rainfall in the south created excellent moisture conditions for spring planting of soybeans and corn.

ARGENTINA: Last year's corn and soybean crops progressed through the reproductive stages in southern Santa Fe and northern Buenos Aires with less than favorable moisture supplies. Significant rain came too late to substantially improve yields of corn and first crop soybeans, but was favorable for second crop soybeans. Generally favorable harvest weather persisted for the corn and soybeans. Northern cotton areas in Chaco and Formosa benefited from adequate precipitation during the growing season. Heavy rains in April and early May damaged some maturing cotton. Wheat areas in southern Santa Fe and southern Buenos Aires received good preplanting moisture up until late June. Dry, cool weather prevailed during the wheat planting season which extends through August. The lack of rain dried topsoils and may have resulted in some poor early establishment of late planted crops. However, subsoil moisture should have been well supplied from the earlier rains and the cool weather kept moisture demand at a minimum. In early

September, widespread rain benefited topsoils in the wheat region improving growing conditions. Warm, dry weather over northern and western wheat areas in early October increased the moisture demand during the critical reproductive period. Spring crop planting is underway in Argentina and recent rains in Buenos Aires have created favorable moisture for early establishment of corn, sorghum, soybeans and sunflowers. Dry conditions prevailed in the major corn, soybean, and sorghum region of southern Sante Fe until recently. Widespread rain over these crop areas improved moisture supplies for wheat development and summer crop planting.

AUSTRALIA: The severe drought that encompassed Australia last season, which reduced yields by 50 percent, was broken this spring by heavy rains. The precipitation persisted from March through May in Queensland and New South Wales, causing flooding and delaying winter wheat planting. Generally favorable weather followed over the entire wheat belt and raised yield prospects considerably over last year's yield. Moisture conditions are presently adequate for planting and early growth of summer crops in southern Queensland and New South Wales as the planting season gets underway.

SOUTH AFRICA: Following last season extreme drought, soil moisture reserves are virtually nonexistent. The drought reduced last year's corn production from initial expectations of 14 million tons to approximately 4 million. Corn planting begins with the onset of the rainy season in early October. Recent significant rains in the Maize Triangle are a positive indication of a return to relatively normal precipitation during the early part of the wet season. However, much more moisture is needed to break the drought conditions and create favorable moisture supplies for early crop establishment.

J. Norman Reid and Patrick J. Sullivan, Economic Research Service

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The condition of our Nation's public infrastructure has received much attention recently in both the press and on Capitol Hill. Interest has been fueled by regular reports of train derailments, water main breaks, collapsing bridges, and the like. The perception that our Nation's public facilities are deteriorating at an alarming rate and that some sort of policy initiative is needed to reverse this trend and "rebuild America" has led to the introduction of much legislation to deal with the "infrastructure problem."<sup>1</sup> Nonetheless, because there has been no systematic and periodic collection of facilities data, little factual information exists about the overall condition of our stock of public capital. This paper details one effort to provide Federal policymakers with a one-time assessment of the condition of rural infrastructure--the National Rural Community Facilities Assessment Study (NRCFAS)--and reports some results of an initial analysis of the NRCFAS data.

#### INTRODUCTION

Several studies have been published recently which attempt to measure the extent of our Nation's public facilities needs [3,5,6]. Choate and Walter point out that government spending for fixed capital investment, corrected for inflation, has declined steadily for the past 15 years [2]. Based on these investment trends, the Associated General Contractors of America estimates that \$3 trillion will have to be spent over the next two decades to repair and replace existing public facilities [1]. Such spending, if undertaken, would triple our current annual investment in public works. In contrast, a recent survey of 800 cities by the National League of Cities found that only modest increases in investment would be needed to finance high priority capital projects in these cities [6].

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<sup>1</sup>For an overview of the infrastructure-related legislation introduced early in the 98th Congress and a review of the issues involved in the public debate, see [4].

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One explanation for these widely divergent assessments of the infrastructure problem is that reliable data on the extent of the problem simply do not exist. The public debate concerning the appropriate governmental response to perceived infrastructure problems has been based on anecdotal evidence, detailed studies of facilities in a few large cities, and investment trends. Based on this piecemeal and often conflicting information, researchers and policymakers alike have been unable to reach a consensus on the extent of our infrastructure problems.

What is needed to help answer questions about the extent of our public facility needs, the distribution and causes of unmet needs, and possible financing alternatives is a systematic inventory and assessment of our Nation's public facilities. While there have been nationwide inventories of particular types of facilities, such as wastewater treatment plants, and general assessments of public facilities needs in a few individual States, no general inventory of the Nation's public capital stock has ever been attempted.<sup>2</sup> To date, the closest approach to a general inventory of public facilities is a study funded by the Farmers Home Administration to assess public facilities needs in rural America.

That study, known as the National Rural Community Facilities Assessment Study (NRCFAS), was begun in 1978 when Abt Associates, Inc., a Boston consulting firm, was selected to design and implement a national survey of rural community facilities. As originally conceived, the NRCFAS would have collected and analyzed information on a wide range of public facilities serving rural communities. While the eventual study was limited to a small number of facilities, the process of developing the NRCFAS has provided valuable insights into the complexities and tradeoffs involved in inventorying and assessing public facilities. Furthermore, the data collected by the NRCFAS affords a unique opportunity to assess the condition of several types of public facilities serving rural communities. The remainder of this paper is devoted to describing the NRCFAS and reporting some results from an initial analysis of the NRCFAS data.

## ISSUES IN BUILDING THE NRCFAS

In developing the study, a number of important measurement and conceptual issues were addressed.

### Survey of Needs vs. Inventory of Facilities

Two principal approaches to assessing public facilities are possible. One is to ask knowledgeable respondents, such as local

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<sup>2</sup> Congress is currently considering two bills which would require the U.S. Department of Commerce to undertake an inventory of the Nation's infrastructure: H.R. 1244--The Federal Capital Investment Budget Act--introduced by Representative Clinger, and S.23--The Rebuilding of America Act--introduced by Senator Moynihan.



government officials or Federal government officials serving in the local area, what their public facilities needs are—that is, what facilities do they have and what do they lack, and which present facilities need repair or replacement? This method has the obvious disadvantage of being highly subjective and therefore unlikely to produce results that are either scientifically valid or politically acceptable. The NRCFAS chose the second alternative—an inventory of selected facility characteristics that would be collected consistently across all communities in the study and to which evaluative standards could be applied during the analysis of the data.

### Survey of Facilities or Communities

This is essentially a matter of how the inventory is to be carried out. One method is to identify all of the service-producing facilities in rural areas, such as public water systems, and collect information about a sample of them. Such a study would provide information about the characteristics and condition of producers of rural services, such as water supply. An alternative method is to take a community-oriented perspective and direct attention to the facilities that serve particular rural places, regardless of whether they are located in that community or another. This approach, chosen for the NRCFAS, has the advantage of permitting observations about communities that are lacking a service altogether and those whose services are supplied by more than a single provider.

### Range of Facilities

Rural communities have a wide range of community services, some of more interest than others for Federal policymaking. A narrowly-defined study concentrating on specific facilities historically aided by Federal programs might help build a record demonstrating apparent need for additional facilities, but it would be more difficult using such a study to develop defensible estimates of needs. Since some substitution among individual facilities is possible, a broader study that includes the principal available substitutes provides a sounder method of assessing facility needs. For example, it is difficult to accurately judge the adequacy of public water service to a community in the absence of any knowledge about the availability and quality of on-site water supplies within the community. In the initial phases of the study, the NRCFAS attempted to take this broader approach.

### Facilities Conditions vs. Service Outputs

Although the principal policy issues that motivated the study relate to public capital facilities, their ultimate importance lies in being an input into the production of public services. From a quality of life perspective, it is the adequacy or inadequacy of public services within a community which is important, not the condition of the community's public facilities. To accurately measure facility needs, an inventory of service outputs and all production inputs is necessary; the former to determine the adequacy of production and the latter to determine needs for specific inputs.

Besides capital, other inputs, chiefly labor, also contribute to the amount and quality of public services. To fully understand the most appropriate policy responses to the needs of individual communities, it is necessary to know how services are produced in these communities and what mix of capital and labor is most efficient in each instance. A survey that includes the full range of service-producing inputs would make possible an assessment of service production methods using different mixtures of inputs. The NRCFAS attempted to include information on non-capital inputs and service quality measures for some services, but for the most part the survey is limited to data on the primary capital facilities themselves.

### Measuring Needs for Facilities

Establishing the need for public facilities presents a number of difficult issues. On the one hand, purely engineering criteria can be used to establish the condition of a facility—its safety and adequacy for meeting its designed purpose. However, such criteria are insufficient to measure need in the absence of additional information about the demand for the facility and the benefits and costs of upgrading and expanding the capital stock. There is not always sufficient economic justification to repair or replace each facility that becomes dilapidated or outmoded or to build new facilities where none currently exist, and judgements about needs must take both criteria—engineering and economic—into account. The NRCFAS attempted to collect data relevant to each for use in calculating facility needs.

In its initial form, then, the NRCFAS was to be a community-based approach to determine facility conditions for a wide range of services. The study was to objectively determine needs based on an assessment of both facility and community characteristics. The effort called for by these decisions was clearly massive. In order to avoid duplicating existing data collections, an exhaustive search of Federal and State secondary data sources was conducted. While in a few instances national data sets of potential value to the NRCFAS were identified, State data sets were found to be sufficiently disparate in content and quality to make a national study based on them impossible [7].

After the completion of pilot testing in March, 1980, the study called for inventorying 37 discrete types of facilities and related services in 11 major service categories (figure 1). Nineteen questionnaires were developed for this purpose, and a national sample frame encompassing the 50 States and Puerto Rico was developed. The survey data were to be supplemented with information from several secondary sources. The NRCFAS questionnaires were designed to collect information about five principal dimensions relating to each facility surveyed: 1) accessibility to the community; 2) capacity to meet expected demand; 3) diversity—the range of services supported by the facility; 4) quality of the facility; and 5) present condition of the facility.

Figure 1--List of NRCFAS community facilities.

I. SERVICE FACILITIES

A. Education

1. Elementary Schools
2. Middle Schools
3. Secondary Schools
4. Public Libraries

B. Health

1. Hospitals
2. Nursing Homes
3. Ambulatory (Outpatient) Care Facilities
4. Ambulatory Dental Care Facilities
5. Ambulatory Mental Health Facilities
6. Residential Facilities for:
  - a. orphans & dependent children
  - b. the emotionally disturbed
  - c. alcoholics & drug abusers
  - d. the physically handicapped
  - e. mentally retarded
  - f. blind & deaf
7. Emergency Vehicle Services

C. Justice

1. Law Enforcement Facilities
2. Jails

D. Recreation

1. Community Recreation Facilities

E. Transportation

1. Railroad Facilities
2. Airports and Related Facilities
3. Streets and Highways  
(Including Bridges)
4. Inter- and Intra-Community  
Transit

II. PRODUCTION FACILITIES

A. Energy

1. Direct Power Suppliers

B. Fire Safety

1. Fire Stations
2. Vehicles
3. Communications System
4. Water Supply and Storage

C. Solid Waste

1. Collection Facilities  
and Equipment
2. Disposal Sites

D. Telecommunications

1. Cable Television
2. Over-the-Air Television
3. Disaster Preparedness

E. Waste Water

1. Sewer Mains and Collec-  
tion Systems
2. Treatment and Disposal  
Systems

F. Water Supply

1. Community Systems  
Storage Facilities  
Treatment Facilities  
Delivery Facilities
2. On-Site Wells and Cisterns

NOTE: This list represents the final selection of facilities to be inventoried in the national survey phase of the NRCFAS before the scope of the study was reduced. Originally, 53 types of facilities were considered for the inventory. The study divided facilities into two categories: service facilities produce services which are consumed where they are produced; production facilities produce goods and services that are consumed elsewhere (i.e. at the home or business of the consumer).

SOURCE: National Rural Community Facilities Assessment Study, Supporting Statement for OMB Clearance Request for the National Survey, (Boston: Abt Associates, Inc., 1980).



In 1981, however, the scope of the study was significantly cut in order to hold down budget costs. Field interviews with local public officials were limited to three questionnaires dealing with fire protection, public water systems, and general community information. The latter collected information on local roads, intercity transportation, and a variety of other facilities and background information on the communities themselves. In addition, secondary data for wastewater treatment, hospitals, and nursing homes was assembled for the communities in the NRCFAS survey.

At the same time, the size of the NRCFAS sample was reduced to 520 communities in the 48 contiguous States, eliminating the possibility of reporting facility totals for individual States but allowing estimates for the Nation, the four Census regions, and six community size categories. Following the field interviews and the coding, cleaning, and editing of the data by Abt Associates during the Fall and Winter of 1982, the data were turned over to the Economic Research Service for analysis.

#### PRELIMINARY RESULTS FROM THE NRCFAS

While conclusions about the condition of rural infrastructure are premature at this point, some preliminary findings from the NRCFAS can be reported. The data in the following pages represent a selection of items from the survey.<sup>3</sup> A more detailed reporting of these items will be released shortly.

##### Rural Population

The NRCFAS universe included more than 45,000 rural communities (table 1). Of these, 35 percent (16,049) are incorporated places with populations of up to 50,000. The great majority of these places are quite small. Almost 80 percent of incorporated places have fewer than 2,500 residents, and only five percent have more than 10,000 residents. The remaining two-thirds of rural communities are unincorporated areas such as townships or equivalent areas. While the populations of unincorporated communities range up to nearly 49,000, the great majority are small. Their size distribution is quite similar to that of incorporated communities.

Some 85 million persons reside in these rural communities. While large numbers of rural citizens live in places of some size, the great majority do not, with most (55 percent) choosing to reside in an area that is not served by an incorporated municipality. Over half of rural citizens who do live in an incorporated place live in communities with less than 10,000 population, and 25 percent live in incorporated places with under 2,500 residents.

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<sup>3</sup>This section highlights selected results from a larger report currently in preparation. Other ERS staff contributing to the analysis are MonaCheri P. Clarke, Leon B. Perkinson, Thomas F. Stinson, and Eleanor Whitehead.



Table 1 — Communities and population in the NRCFAS rural universe

		Population, 1978						
Item	Units	20,000	10,000-	5,500-	2,500-	1-	Unincor- porated areas	U.S.
		49,999	19,999	9,999	5,499	2,499		
Communities								
	Number	296	557	837	1,821	12,538	29,717	45,766
	Percent	0.6	1.2	1.8	4.0	27.4	64.9	100.0
Pop. 1978								
	Number	8.7	7.7	6.2	6.7	9.2	47.1	85.6
	Percent	10.2	9.0	7.2	7.8	10.7	55.0	100.0

NOTE: Excludes Alaska and Hawaii. Detail may not add to totals due to rounding.

SOURCE: National Planning Data Corporation, Universe of Rural and Urban Communities, 1980.

PREPARED BY: State and Local Government Section, Economic Development Division, ERS, USDA, October 1983.

Table 2 — Characteristics of public water systems serving rural communities, by community size, 1980: preliminary estimates

Item	Population, 1978					Unincorporated areas	U.S.
	20,000-49,999	10,000-19,999	5,500-9,999	2,500-5,499	1-2,499		
<hr/>							
	<u>Percent of all rural communities</u>						
Community not served by: a public water system	0	0	0	0.5*	14.5	62.5	44.7
	<u>Percent of communities with public water service</u>						
Communities with 67-100 percent of pipeline over 50 years old	13.4	17.8	29.2	21.2	20.7	15.0	18.4
Communities with public water systems which did <u>not</u> test for:							
coliform bacteria at least 12 times in previous year	0	4.9	1.9*	5.7	10.4	20.5	13.9
inorganic materials at least once in previous year	12.5	8.8	21.1	21.7	26.5	35.7	29.4
organic contaminants at least once in previous year	20.9	24.2	15.0	17.7	31.2	45.1	35.5
turbidity at least once in: previous year	11.7	22.1	38.4	33.0	57.0	58.7	54.1
radioactivity at least once in the last 3 years:	21.0	41.6	25.5	31.8	44.1	53.7	46.4

\* Indicates estimate is not significantly different from zero at the .05 level (one-tailed test).

NOTE: Excludes Alaska and Hawaii.

SOURCE: Public Water Supply questionnaire, National Rural Community Facilities Assessment Study.

PREPARED BY: State and Local Government Section, Economic Development Division, ERS, USDA, October, 1983.

## Public Water Supply

Approximately 55 percent of the Nation's rural communities are served by one or more public water systems (table 2).<sup>4</sup> The remaining 45 percent rely on private wells, small cluster wells, other on-site water supplies, or hauled water for all of their water needs. Virtually all cities with populations exceeding 5,500, and the vast majority of smaller ones, have public water service for at least a portion of their populace. In most cities more than two-thirds of the year-round households have access to a public water system.

The picture in unincorporated rural areas is quite different. Only 38 percent of these generally sparsely populated areas are served by a public water system. Furthermore, in only 17 percent of these unincorporated areas are two-thirds of the community's year-round households served by a public water system.

The age of the water distribution system can indicate the potential need for repairs and replacement, since older pipes are more likely to break or leak, interrupting service, adding to production requirements, and raising public health concerns. In roughly 18 percent of rural communities, over two-thirds of the pipelines are more than 50 years old.

Water quality depends heavily on the system's operating procedures, in addition to its physical facilities. Testing is important to assuring an adequate supply of safe water, and periodic monitoring of water quality is required to adequately disinfect contaminated water. Among communities with public water service, 21 percent of the unincorporated areas and 10 percent of cities with populations under 2,500 were served by systems that did not test for the presence of coliform bacteria—perhaps the most widespread problem with rural water. Even larger proportions failed to perform other tests (table 2).

## Wastewater Treatment

Fewer than one-third of all rural communities were served by wastewater treatment plants in 1978 (table 3). Nearly all the communities served had their own plants, but a small percentage used a facility located outside the community's border. Of those without a treatment plant, about 15 percent had completed plans to construct one.

Most communities without treatment facilities were unincorporated areas where individual, on-site disposal is used. Only 11 percent of unincorporated areas had any residents served by a treatment plant,

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<sup>4</sup>A public water system is one that provides piped water for human consumption to at least 15 service connections. The term does not imply public ownership and many public water systems are, in fact, privately owned and operated.

Table 3—Wastewater treatment facilities in rural communities, by community size, 1978: preliminary estimates.

Item	Population, 1978						Unincorporated areas	U.S.
	20,000 49,999	10,000- 19,999	5,500- 9,999	2,500- 5,499	1- 2,499			
<u>Percent of all rural communities</u>								
Communities served by a wastewater treatment plant	98.5	98.4	98.6	94.4	51.5	11.2		28.8
Communities with plans to build own plant	17.5	5.5	6.4	6.4	32.1	3.6		11.8
<u>Millions</u>								
Population within service area of rural wastewater treatment plants:								
Population served	10.4	8.3	6.7	7.2	7.0	15.8		55.5
Population not served	1.8	1.5	1.7	1.4	2.7	11.1		20.1
Total population in service area	12.2	9.7	8.4	8.6	9.8	26.9		75.6
<u>Percent of communities served by own treatment plant</u>								
Average effluent flow as percentage of system designed capacity								
100 - 120 percent	6.1	13.0	6.9	7.5*	13.7	4.3*		10.4
over 120 percent	13.2	7.7	13.3	19.9	13.3	9.9*		13.3
<u>Billion dollars</u>								
Costs of construction to meet 1983 Clean Water Act goals:								
Improvement of existing facilities	1.3	1.9	1.7	1.5	1.3	5.3		13.1
Construction of planned facilities	0.2*	0.2*	0.1*	0.2*	3.6	6.9		11.2
Total	1.5	2.1	1.8	1.7	4.9	12.2		24.3

\* Indicates estimate is not significantly different from zero at the .05 level (one-tailed test).

NOTE: Excludes Alaska and Hawaii. Cost figures reported in 1978 dollars.

SOURCE: U.S. Environmental Protection Agency, 1978 Wastewater Needs Survey.

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and only 8 percent had a treatment plant actually located in the community. By contrast, more than half of the smallest cities, and nearly all of the larger ones, had their own wastewater treatment systems.

Approximately 76 million people lived in the service areas of rural wastewater treatment plants in 1978.<sup>5</sup> Only 56 million actually used these facilities, however; the other 20 million relied on on-site disposal.

One measure of the adequacy of existing wastewater treatment facilities is the ratio of average effluent flow to the facility's designed capacity. If the ratio is greater than 1.0, additional treatment capacity may be required to meet even normal conditions. In 1978 nearly one fourth of all rural communities with wastewater treatment plants had wastewater flow ratios greater than 1.0, and in slightly more than 13 percent of rural communities average system flow exceeded the design capacity of their treatment plants by more than 20 percent.

Data from the 1978 EPA Wastewater Needs Survey indicate that it would cost slightly more than \$24 billion (in 1978 dollars) to bring wastewater treatment facilities located in rural communities up to the level established as a 1983 goal by the Clean Water Act. Of that amount, approximately \$13 billion would go to upgrade existing facilities, while \$11 billion would be needed for new treatment plants. Approximately 50 percent of the funds would go to unincorporated areas, and about 20 percent to cities with populations less than 2,500.

### Hospital Services

Nearly all rural communities were served by some kind of hospital facility in 1977 (table 4). Only two percent had no hospital within a 30-mile radius and only 14 percent had fewer than three hospitals within that same area. Sixty percent of rural communities were served by five or more hospitals. This does not mean, however, that the vast majority of rural communities have a hospital within their borders. Regardless of where they live, people routinely travel to obtain medical care. For the NRCFAS, it was assumed that all facilities within 30 miles of the sample community serve the community's residents.

Despite the nearly universal availability of some hospital facilities in rural areas, somewhat larger numbers of rural communities were found to be without some services often provided by hospitals. Only about three percent of rural communities did not have access to an emergency room, and just six percent did not have access to a hospital blood bank. But the more specialized hospital services

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<sup>5</sup> Some of the 76 million may include urban area residents served by a facility located outside the urban area. Thus, these figures do not necessarily represent the number of rural residents who have or lack wastewater treatment services.



Table 4—Hospital facilities available to rural communities, by community size, 1977: preliminary estimates

Item	Population, 1978					Unincorporated areas	U.S.
	20,000 49,999	10,000- 19,999	5,500- 9,999	2,500- 5,499	1- 2,499		
<u>Percent of all rural communities</u>							
Number of hospitals:							
None	0	0	0	0	2.2*	2.3	2.1
One	5.8	9.8	2.8*	3.8	4.2	5.5	5.1
Two	0	5.4	6.8	10.4	7.1	7.0	7.1
Three or four	16.9	21.4	14.9	17.8	19.3	26.6	23.9
Five or more	77.5	63.5	75.5	68.0	67.1	58.6	61.8
Communities without:							
Emergency rooms	0	0	0	0	4.0	3.5	3.4
Blood bank	2.0*	8.9	9.4	7.7	6.7	5.8	6.2
Communities with specialized hospital services:							
Postoperative recovery room	100.0	100.0	100.0	97.5	96.7	94.7	95.6
Intensive care	100.0	96.9	98.7	98.7	94.8	97.1	96.6
Neonatal intensive care	55.8	39.5	51.2	42.5	40.5	35.2	37.4
Electroencephalograph	97.8	87.7	89.8	82.8	82.4	79.8	81.0
Hemodialysis	59.9	50.6	50.0	52.8	46.8	45.0	46.1
Psychiatry	74.9	55.9	58.6	59.9	50.2	55.8	54.6
Pediatrics	91.6	77.9	76.3	81.4	76.7	74.4	75.5
Premature nursery	86.7	78.1	82.7	78.1	72.9	66.7	69.4
Pharmacy	100.0	100.0	100.0	97.6	97.8	97.1	97.4

\* Indicates estimate is not significantly different from zero at the .05 level (one-tailed test).

NOTE: Services are considered "available" to a community if a hospital is located within 30 miles. Detail may not sum to 100 percent due to rounding. Excludes Alaska and Hawaii.

SOURCE: American Hospital Association, Annual Survey of Hospitals, 1977.

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were available in far fewer rural communities. Only 37 percent had neonatal intensive care, and 46 percent had hemodialysis facilities. Psychiatry was available to 55 percent, premature nursery services to 69 percent, pediatrics to 76 percent, and electroencephalograph to 81 percent. Unincorporated communities were more often without these hospital services.

These data provide only a partial profile of the availability of health care facilities to rural communities. Many medical and health care services are provided by institutions other than hospitals--most notably by medical and other health care clinics and by private practitioners, facilities not included in the NRCFAS data base. Thus these findings, while indicating the availability of important hospital-based facilities, do not necessarily reflect the overall quality of health services available to rural residents.

### Fire Protection

Most rural communities had access to some fire protection in 1980. Only two percent, concentrated entirely in the unincorporated areas, had no fire service at all (table 5). Of those with fire service, about 7 percent have fire equipment other than pickups, jeeps, or autos housed outside a fully enclosed building.

Slightly more than 40 percent of rural communities with fire service had neither full coverage of their community with fire hydrants, nor service by trucks with at least 3000 gallons of tank capacity. More than half the communities in unincorporated areas lacked such tank truck capacity or hydrant coverage.

### CONCLUSION

This paper has reported some of the results of an initial analysis of data on rural public facilities. This analysis has concerned itself with only a small amount of the information collected by the NRCFAS, so extreme caution should be used in trying to interpret the results. A more detailed analysis of the data is required before any assessment of the condition of rural public facilities can be attempted.

Even when a full analysis of the NRCFAS data is complete, many policy questions will remain unanswered for several reasons. First, the NRCFAS data are limited to only a small number of facilities, affording little or no information on alternative methods of providing services. As a result, any measure of the adequacy of inventoried facilities will be tentative at best. Second, to assess public facilities needs, existing facility conditions must be weighed against some kind of standard. Since standards are fundamentally value judgements about how things ought to be, they inevitably vary with individual perceptions and biases. As a result, truly objective measures of public facility needs are impossible no matter how sound

Table 5—Availability of fire protection in rural communities, by community size, 1980: preliminary estimates

Item	Population, 1978						Unincorporated areas	U.S.
	20,000-49,999	10,000-19,999	5,000-9,999	2,500-5,499	1-2,499			
<hr/>								
	<u>Percent of all rural communities</u>							
Communities without fire protection	0	0	0	0	0	3.4	2.2	
<hr/>								
	<u>Percent of rural communities with fire service</u>							
Communities with one or more trucks not housed in fire station	13.9	14.0	14.4	9.2	7.0	5.9	6.7	
Communities lacking complete hydrant coverage or truck tank capacity totalling 3000 gallons	11.1	8.3	8.5	11.6	20.5	54.1	41.3	

NOTE: Excludes Alaska and Hawaii.

SOURCE: Fire Agency questionnaire, National Rural Community Facilities Assessment Study.

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the methodology or how accurate the data used to assess facility conditions. And finally, the NRCFAS data pertain to only one point in time. An analysis of the dynamics of the infrastructure problem--whether things are getting better or worse, and at what rate of speed--must await follow-up inventories of facilities.

With these caveats in mind, no attempt is made here to sum up the condition of rural facilities or to assess the adequacy of existing facilities. However, one observation about the existence of rural facilities seems appropriate, even at this early stage of the analysis. In virtually every facility area examined, the absence of public facilities was most pronounced in unincorporated areas and the smallest towns. While this is not surprising, and may not be indicative of a problem, the fact that these two community categories experienced significant population growth over the last decade suggests that further study is prudent. While the national concern may be focused on deterioration of public infrastructure, the most pressing problems for a sizable number of growing rural communities may be associated with the lack of infrastructure.

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The practice of statewide highway planning by state transportation agencies involves setting priorities and scheduling improvement projects. Providing adequate rural roads and bridges to support rural economic activity is becoming more crucial as economic deregulation and reductions in rail and air service continue to occur and as the rural residents' expectations with respect to mobility change. With less attention being given to planning future systems, the Transportation Research Board suggests transportation agencies devote more time to supporting the development and expansion of the states' economic development.<sup>1</sup> To accomplish this, the agencies will have to maintain a greater level of awareness of the events in the private transportation sector, recognize the role transportation plays in the transport of products, and extend their studies into the systems of enterprises which exist. The systems of enterprises, for example, may be combinations of farms, railroads or trucking firms, storage or processing companies, and even international shippers. Included in this task is the need to understand the demographic, geographic, and economic forces at work and how these forces relate to the state's transportation system. To achieve this understanding, the agencies will have to work more closely with the other departments of government, such as agriculture, as well as with the private enterprises.

#### Rural Roads and Bridges - National Perspective

In the United States, the rural road system is vast, consisting of 3.2 million miles. This accounts for over 80 percent of the total U.S. mileage (Table 1). The rural mileage, as classified by the Federal Highway Administration (FHWA), includes all roads outside of populated areas of more than 5,000 people. On these roads FHWA reports there are over 460 thousand bridges twenty feet or greater in length.<sup>2</sup>

The rural system is composed of four functional classes of highways: interstate, other arterial highways, collectors, and local roads. Arterial highways, including the Interstate System, provide the network for intrastate and interstate travel and generally accommodate high volume traffic on long trips. Collectors generally provide for travel of a more localized nature, serving county seats and other traffic generators such as shipping and receiving points which are not directly served by the arterial routes. Local roads are by far the most extensive network in rural areas, providing for short distance travel to access homes, businesses, and land. In 1981, local roads accounted for 69 percent of the rural road mileage and 58 percent of the

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total mileage, rural and urban, in the U.S. (Table 1).

Table 1. Rural Mileage by Functional Classification by Region--1981

Census Region	Inter-state	Other Arterial	Collector	Local	Total Rural Miles	Total U.S. Miles
Northeast	3,188	21,649	55,998	165,778	246,613	369,977
North Central	8,673	79,442	276,901	778,814	1,143,830	1,306,382
South	11,068	82,398	264,864	728,313	1,086,643	1,311,042
West	10,030	46,992	142,161	544,415	743,598	865,296
Total	32,959	230,481	739,924	2,217,320	3,220,684	3,852,697
Percent of Rural Miles	1.0	7.1	23.0	68.9	100.0	-
Percent of U.S. Miles	0.9	6.0	19.2	57.5	83.6	100.0

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, 1981, Table HM-20.

Most of this rural road system is owned, operated, and maintained by State or local jurisdictions. In 1981, 69 percent of the rural road mileage was under local (county or town/township) control, 23 percent under State control, and 8 percent under Federal control (Table 2). A significant portion of the rural mileage in the West is under Federal control due to the large amounts of public land in Federal parks, forests, and reservations; furthermore, many of the South Atlantic states in the South have assumed legal responsibility for all or a portion of their county roads.

Many rural roads and bridges, primarily those on the local and collector systems, were constructed in the late 1800's and early 1900's when overland transportation was limited to horse and wagon or the recently built railroad lines. Through some improvements, the widths, grades, bases, surface designs, and capacities of many rural roads and bridges are currently based on the traffic needs of the 1940's and 1950's.<sup>3</sup> FHWA reports in its 1983 status report to Congress that the secondary, or rural major collector, system is in the poorest condition of the systems eligible for Federal financing.<sup>4</sup> Information on the physical and operating conditions of the local roads is scarce since only a very limited data collection exists for local roads. The most recent and in-depth local road information was collected in a U.S. DOT survey in 1970.<sup>5</sup> The information suggests that more than 50 percent of the local

road mileage is structurally inadequate by reason of surface type and condition and/or safety deficiencies, such as inadequate lane width or lack of shoulders. This survey has not been updated, but the General Accounting Office reports that the available statistics indicate the deficiencies still exist.<sup>6</sup>

Table 2. Percentage of Rural Mileage by Jurisdiction by Region--1981

Census Region	Local Control	State Control	Federal Control
Northeast	68	32	<1
North Central	87	13	<1
South	62	37	1
West	55	13	32
United States	69	23	8

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, 1981, Table HM-10.

U.S. DOT believes these road conditions are significant but reports to Congress that bridge conditions are of special concern because bridge deficiencies can cause substantial loss of life, can interrupt the efficient flow of traffic, and repair or replacement is usually much more expensive than other types of highway improvements.<sup>7</sup> Nearly half the Nation's rural bridges are rated deficient (Table 3), either for structural or functional reasons. About 90 percent of these deficient rural bridges are on rural collector or local roads, which also account for 80 percent of the total number of deficient bridges in the U.S.

Structural deficiencies occur primarily because of the lack of proper maintenance due to perhaps insufficient funds, exposure to the elements, general wear, and poor initial design. Functional obsolescence results from increased traffic, changing patterns and needs, and higher safety standards. U.S. DOT reports that many bridges may be considered functionally obsolete even though they are in good structural condition. For example, if a 30-year old bridge was designed and built for 10-ton loads and is now required to carry 20-ton loads, then its structural condition is no longer adequate and the bridge is considered to be functionally obsolete.

The goals, conditions, and needs of the rural roadways vary widely by region, but in general, the sheer magnitude of the rural system creates a

problem. Today there is a shift in emphasis from building new roadways to maintaining adequate performance levels on the existing roads and bridges. Given today's financial realities, the challenge for road officials is to find and use innovative ways to provide for adequate transportation with the limited funds available. A case study follows explaining how one state through public/private cooperation is trying to plan and program road and bridge improvements that will support the economic development of its rural areas.

Table 3. Rural Bridges by Functional Classification--1981

Item	Inter- state	Other Arterial	Collector	Local	Total Rural Bridges	Total U.S. Bridges
Number of Bridges	26,474	74,327	141,503	219,480	461,784	553,310
Number of Deficient Bridges	2,405	19,088	54,339	143,339	219,480	244,241
Percent of Class	9.1	25.7	38.4	65.3	47.5	44.1
Percent of Total Rural Deficiencies	1.1	8.7	24.8	65.4	100.0	-
Percent of Total U.S. Deficiencies	1.0	7.8	22.3	58.7	89.8	100.0

Source: U.S. Department of Transportation, Status of the Nation's Highways: Conditions and Performance (Washington, D.C.: Federal Highway Administration, June 1983), p. III-26 and III-27.

#### A Case Study - Pennsylvania

In Pennsylvania (PA), an effort is underway to incorporate the State's agricultural transportation needs into its statewide highway planning and programming activities. Incorporating the agricultural needs is very important to PA, since one of five jobs in PA is reported to be agriculture or agri-business, including those jobs with supermarkets, trucking, processing, and production firms. These businesses also indirectly contribute to the economy of the State by purchasing large quantities of petroleum products, machinery, equipment, materials, and services.

The statewide effort is based upon the results of a two-county pilot study which was completed earlier this year. The pilot study developed a process for incorporating local input from local agricultural producers and



suppliers, for identifying the essential roadways which provide access to the rural agricultural areas for the transport of agricultural and forestry products to market and supplies to the businesses, and for identifying the key transportation obstructions inhibiting the movement of the products and supplies. The identification of an Agricultural Access (Agri-Access) Network of roadways provides PA with important information concerning which future roadway improvement projects will yield the greatest economic benefits to its agricultural and rural communities.

### Background

Many of PA's rural roads and bridges were first constructed when farm and forestry products moved to nearby markets in small quantities on small light-weight vehicles. Today, both commodities and farm supplies travel greater distances in larger trucks which carry loads at or near maximum legal limits of 80,000 pounds. PA, with approximately 56,000 bridges, has over 4,000 structures which are restricted to loads of 20 tons or less and many other bridges which are obsolete for today's travel. These obstructions cause trip diversions which translate into higher operating costs and eventually higher costs paid by consumers.

The identification of an Agri-Access Network is a follow-up to another recent planning initiative of the PA Department of Transportation (DOT) involving the improvement of commercial transportation and promotion of economic development. In 1982, planning personnel worked with local and regional planning agencies to identify a Priority Commercial Network (PCN) which is mainly composed of interstate routes, primary traffic routes and key coal haul routes, handling heavy volumes of truck traffic and serving as the economic backbone of the State. While the PCN provided valuable priority-setting information on the heaviest truck routes, many roads serving the rural areas and the agricultural industry were not included. For this reason, the pilot study was conducted to identify those highways providing access between the PCN and the rural agricultural areas.

The approach used in the pilot study, and which is being carried over to the statewide effort, had two principle characteristics:

- (1) the study used existing data bases and information sources, thereby eliminating the need for extensive new data collection, and
- (2) the study relied upon input from representatives at the local level for the identification and refinement of the network.

### Coordination and Local Participation

The pilot study was guided at the State level by an Agricultural Transportation Task Force consisting of representatives of Federal, State, and local government and the farm organizations. The Task Force was structured into a steering committee and a work group. The steering committee provided direction and advice throughout the study. The work group assured the timely performance of scheduled tasks. Work group participants provided the link between state officials and local leaders of their respective organizations.

Local participation was very prominent at several points in the study. In the initial meeting at the county level, county Extension agents provided

valuable knowledge on the agricultural economy and the location of generators of heavy agricultural loads. Meetings with key representatives of the farm organizations yielded the preliminary network identification and information on how the transportation system affects particular operations. During the refinement task, all involved groups reviewed the initial findings and made recommendations for revisions and priorities.

### Methodology

The work program for the pilot study was composed of several tasks, each yielding specific products. While most tasks were related to the identification of the Agri-Access Network and obstructions on that network, certain tasks were directed to the development of information to aid the formation and application of a statewide study. A description of the methodology is divided into three general phases: preliminary identification; data analysis and evaluation; and refinement and review.

#### Preliminary Identification:

The first phase of the study was accomplished through field visits and interviews with county extension agents and key representatives of the farm organizations. The main objectives were to identify where the major agricultural activities are taking place and to identify a preliminary Agri-Access Network. Maps, specifying the previously identified PCN, provided the basis for identification. This eliminated the need for the duplicate identification of the major commercial routes.

Within each county, the major areas of farming activity, the main points for delivery of agricultural products, and the main sources of agricultural supplies were identified and plotted on maps. This included information concerning the major rural products and the locations where various activities related to these products are taking place. These included, but were not limited to, generators of heavy loads such as lumber, milk and poultry processing plants, feed mills and fertilizer plants. The local participants' knowledge of the agri-business functions was extensive and provided a sound base for further development of the Agri-Access Network.

The next step was the development of a preliminary system of highways deemed most important to carry heavy agricultural loads. These highways provided a complementary network to the PCN. They consisted of those routes providing access to groups of farms and essential agricultural and rural functions. The local representatives readily identified this preliminary Agri-Access Network from their experience. They also noted specific transportation problems related to this network.

#### Data Analysis and Evaluation:

The preliminary network and bridges on the network were identified on the PA DOT data bases. This facilitated data retrieval and analysis during the pilot study. It will also provide for future periodic review and development of information for program prioritization.

Analysis was conducted to identify those agri-access roads most critical to hauling 40 ton loads. Available average daily traffic (ADT) information and truck classification counts were analyzed to determine which highways carry larger 4 and 5 axle trucks. Information gathered from local farm representatives in earlier tasks concerning the benefits of lower rather than maximum load limits to particular activities was also important. Bridge engineers were consulted to determine the feasibility and cost effectiveness of incrementally upgrading bridges to less than maximum load limits.

A most important portion of the work program involved the identification of highway obstructions. Weight-restricted bridges, posted and bonded roads, and other obstructions to agricultural truck traffic on the identified agri-access roadways were identified and located on maps. The bridge information was extracted from PA's inventory of state and local bridges. Throughout the entire study, other data was compiled to be useful in prioritizing the obstructions and deficiencies which were identified. This included such items as 1) county production figures and economic information, 2) approximate number of farmers dependent on a particular deficient bridge or route, and 3) increase in distance and/or time required due to detour.

The evaluations of the preliminary Agri-Access Network involved examining the characteristics of the highways, especially related to function and usage. This facilitated developing criteria as a basis for evaluating agri-access roads in other counties of the State. Several sources of information were examined. Sample truck classification counts were taken to determine the existing level of trucks on the identified roads, the functional classification of the identified network of roads was analyzed to determine the type of use on these highways, and county economic information was examined to develop comparisons of agricultural dependence.

#### Refinement and Review:

The particular objective of this task was to refine initial findings from local knowledge. Organizations participating in this task included the farm organizations, the County Extension Service, regional agricultural representatives, township representatives, local transportation officials, and county planning agencies. Participating organizations were provided maps of the preliminary network and associated listings of identified obstructions. This included the description and status of programmed projects which will eliminate the obstructions.

Each organization was asked to verify information, make suggestions for revisions, and note additional problems related to the movements of agricultural products and supplies. Local officials were also requested to include problems related to the movements of emergency vehicles and loaded school buses. The collection and compilation of the refinement products was facilitated through the county Extension office. Through this task, all organizations had ample opportunity for equal review.

At the conclusion of this local review period, recommendations were incorporated into the network and listings of obstructions. The final products were presented to and approved by the Agricultural Transportation Task Force. This provided a final product which was agreeable to all participating organizations.

### Demonstration Counties

Tioga and Lancaster were the two PA counties chosen for the pilot study. Both areas are highly agricultural, but have differing characteristics which were felt to be representative of conditions in other sections of the State. Tioga County is located along the north central border of the State and Lancaster County is along the southeastern border. A comparison of the two counties is given below.

Table 4. Background Information on Demonstration Counties

Item	Tioga County	Lancaster County
Population	40,973 (50th)	362,346 (7th)
Rural Population	33,846 (83%)	164,580 (45%)
Population of Largest City/Borough	3,805	54,725
Total Miles of Roadway	1,763	3,588
Total Land Area	1,146 sq.mi.	946 sq.mi.
% Forest Land	64	16
% Crop Land	16	62
% Pasture Land	10	3
% Other	10	19
Number of Farms	1,060 (12th)	5,330 (1st)
Value of Agricultural Products	\$47.937 mill. (12th)	\$435.580 mill. (1st)

Sources: Pennsylvania Crop and Livestock Annual Summary, 1981  
Pennsylvania Department of Commerce, Bureau of Statistics  
Pennsylvania Department of Transportation, Bureau of Strategic Planning  
U.S. Department of Commerce, Bureau of the Census

There are significant variations between these counties in the levels of population, road mileage, land usage, and value of agricultural production. The land use patterns are quite different primarily due to differences in the topography of the land.



Lancaster County is very unique since it is the leading agricultural producing county in the State and also contains one of the major urban areas. Much of the value of its agricultural production is reflected in the extensive livestock activities involving dairy, poultry, and meat animals. The county is a leading producer of several crops, including wheat, corn, alfalfa, hay, and tobacco. Heavy truck tonnages are customarily associated with the hauling of such commodities as milk, feed, fertilizer, and products of the poultry processors (broilers and eggs). The city of Lancaster, located in the center of the county, is the hub of economic activity. Many of the industries located in and around the city are related to the agri-business industry. The majority of generators of heavy tonnages to and from the farm are located along main arterial routes included on the PCN.

Tioga County is typical of many of the rural northern counties of PA. This area is mountainous and very sparsely populated. Since the county has no major urban center, much of the economic activity is related to farming. Largely due to the county's mountainous terrain, dairy farming is the principal agricultural activity. Milk production ranks sixth in the state. Heavy truck tonnages are associated with hauling milk in the form of 10-wheel tankers holding approximately 30,000 pounds of milk. The larger milk tanker could provide cheaper costs and more efficient service to the dairy farmer, but the terrain and the current posted bridge situation prevents the use of these larger vehicles. This is a concern since the dairy farmer is responsible for the transportation costs. Over 63 percent of Tioga's land area is forested. The lumber industry produces heavy loads in excess of 75,000 pounds. The timbering activities, however, are scattered and constantly changing locations. Sawmills are located near the PCN routes. A major problem associated with Tioga County is lack of alternative routes. Tioga has 21 percent more land area than Lancaster but has only one-half the mileage of roadways. This is due to the differences in terrain and population. Because of this, detours associated with posted bridges are generally longer.

## Results

The Agri-Access Network was identified in both Lancaster and Tioga counties. The mileage totals are shown in Table 5. The network mileage comparisons between the two counties indicate both similarities and differences. The Agri-Access Network in Lancaster included 50.5 highway miles which are owned by townships, while the network in Tioga included only state-owned mileage. The Agri-Access Network consists of similar mileage totals in the two counties. Although the PCN mileage in Lancaster (376.9 miles) is more than twice that in Tioga (155.1 miles), a summation of both networks indicates that these comprise 51 percent of all state-owned roads in Lancaster and 54 percent in Tioga County.

The Agri-Access Network, as defined during the pilot study, will not necessarily remain constant over time. As with the PCN, the definition and constraints of the Agri-Access Network will be reviewed and revised at timely intervals. Revisions in the network may result from changes in the size and number of farms or in the type and size of farm equipment. The establishment or relocation of agricultural truck generators may affect the importance of adjacent highways. The continuing trend toward rail line abandonments may also place additional burdens on other rural roads and bridges not previously identified.

Table 5. Number of Miles and Bridges on the Agri-Access Network

Item	Tioga County	Lancaster County
Network Mileage	261.9	289.8
State-owned	261.9	239.3
Locally-owned	-	50.5
Network Bridges	189	124
Number Structurally Deficient	52	31
Number Functionally Deficient	24	26
Number Posted	16	18
Number Programmed for Repair	14	15

Bridge restrictions were found to be the most significant restrictions to movements of agricultural products. There are 133 agri-access bridges which are classified as structurally deficient or functionally obsolete. A total of 52 of these deficient bridges were identified during the pilot study. These bridges are currently weight-restricted, critically in need of repair to avoid posting, or were identified by reviewing agencies as obsolete for current travel demands. A total of 29 bridges on the Agri-Access Network are programmed for replacement or rehabilitation under either PA's Bridge Bill, Twelve Year Program, or Maintenance Program.

The Agri-Access Network was evaluated and compared for the two counties. The findings can be used to generalize the type of roadways which were identified during the study and to provide criteria for eventual application of the pilot study principle to other counties of the State. The travel levels and functional classification of the network roadways were the main characteristics which were examined.

A comparison of travel levels indicates considerable variance between the two counties. The majority of network roadways in Lancaster have traffic levels above 1000 ADT. In Tioga, 77 percent of the network roads have less than 1000 ADT, and 44 percent are under 500 vehicles per day. An analysis of truck traffic levels on the network also produces similar results. From sample truck classification counts, an estimate was developed of mileage by average daily truck traffic (ADTT) range. The figures indicate that it is difficult to define equal truck traffic criteria for differing counties such as Lancaster and Tioga. A level of 50 trucks per day is reasonable in Lancaster, but 50 percent of the identified network in Tioga has ADTT below this level.

A comparison of other highway characteristics of the Agri-Access Network yields greater similarities. A large majority of roads in both counties are either major or minor collectors. Collector roads comprise 76 percent of the network in both counties. The separation of mileage by Federal-aid classification indicates that the majority of mileage (56.7 percent) in Tioga is not on a Federal-aid system, and therefore, is not eligible for Federal funding. If locally-owned mileage is included for Lancaster County, 57.1 percent is non-Federal-aid.

Due to the larger and heavier vehicles used in Lancaster County, preliminary analysis did not identify any bridges that would be beneficial at less than the maximum load limits. Because of the conditions particular to Tioga County, such as rugged mountain terrain, isolated rural areas, and long detours, six bridges in Tioga were identified by farm representatives as beneficial if posting limits were raised to only 20 tons. Such upgrading would mean the difference between survival and ruination to approximately 16 farms in Tioga County.

The feasibility of building or upgrading bridges to less than maximum load limits was investigated with bridge engineers. Their analysis showed that it would not be cost effective to build or replace bridges for less than 40-ton limits. It was determined, however, that in certain cases bridges could benefit users if strengthened temporarily to raise load limits above very low levels. Future replacement of the bridge would be necessary as funding becomes available.

A detailed description of the pilot study is available in a report titled Pennsylvania Agricultural Access Network - Pilot Study. The report can be obtained from the Pennsylvania Department of Transportation or from USDA's Office of Transportation.

### Conclusions

The pilot study did identify an Agri-Access Network and provided valuable information for decision making in the PA DOT. It has provided vital knowledge for two counties concerning the relative importance of rural roads and bridges to the rural economic activities. The results can be useful in the determination of which improvement projects will provide for the greatest economic benefits to rural areas.

Involvement of local representatives at various stages was important to the success of the study. The individuals who are most affected by constructions on the roadway system provided direct input concerning the relative importance of particular roads and bridges. The exchange of information between state and local representatives supported the process and resulted in a better local appreciation of state government.

Statewide application of the approach used in the pilot study is expected to require certain flexibility. Travel levels on the Agri-Access Network are expected to vary considerably between different areas of the State. In rural, sparsely populated counties such as Tioga, the relative importance of agricultural activities must guide the development of the network. Certain criteria have been established to evaluate future network identification. Application of these principles in a responsible manner can yield reliable and defensible information.

## FOOTNOTES

<sup>1</sup>Transportation Research Board, "Statewide Transportation Planning," Synthesis of Highway Practice 95 (November 1982), p.4.

<sup>2</sup>U.S. Department of Transportation, Status of the Nation's Highways: Conditions and Performance (Washington, D.C.: Federal Highway Administration, June 1983), p. III-27.

<sup>3</sup>C. Phillip Baumel and Eldo Schornhorst, "Local Rural Roads and Bridges: Current and Future Problems and Alternatives," Transportation Research Record 898 (Washington, D.C.: Transportation Research Board, 1983), p. 374.

<sup>4</sup>U.S. Department of Transportation, Status of the Nation's Highways: Conditions and Performance (Washington, D.C.: Federal Highway Administration, June 1983), p. S-7.

<sup>5</sup>U.S. Department of Transportation, The Status of the Nation's Highways: Conditions and Performance (Washington, D.C.: Government Printing Office, January 1981), p. 103.

<sup>6</sup>U.S. General Accounting Office, U.S. Grain Transportation Network Needs System Perspective to Meet Future World Needs (Washington, D.C., April 8, 1981), pp. 38-42.

<sup>7</sup>U.S. Department of Transportation, The Status of the Nation's Highways: Conditions and Performance (Washington, D.C.: Government Printing Office, January 1981), p. 80.



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### Introduction

Rural development policy of the last several years focused on programs to increase employment opportunities and generate greater income in rural areas. The Rural Development Act of 1972 and the Rural Development Policy Act of 1980, had explicit goals for creating jobs and increasing income of rural residents. These goals were to be attained by subsidizing capital, providing education programs for rural people, and improving the delivery of Federal programs to rural areas. The extent to which these policy goals are met during the growth process is a vital part of the evaluation of rural development (4, 5). In other words are jobs created and incomes raised for specific rural residents as an area's economy grows? The Economic Research Service (ERS) is studying the effect that employment growth has had on employment levels of specific groups of nonmetropolitan residents, particularly long-term residents. This paper presents early findings from two recent ERS surveys in nonmetro areas, one in south central Kentucky and one in south central Georgia, that were designed to examine the distribution of jobs among rural residents.

### Background

Past studies offer some evidence concerning the distribution of economic benefits between long-term residents and immigrants resulting from rural employment growth or industrialization (8, 12, 13). Some studies show that immigrants tend to be younger, better educated, and have higher skill levels than long-term residents (2, 9). This means that immigrants supposedly compete more successfully for jobs and take the higher wage and more desirable ones, leaving the lower wage and less desirable jobs to long-term residents. In studies by Gray (6), Olsen and Kuehn (9), and Shaffer and Tweeten (11), estimates of new jobs taken by immigrants ranged from 19 percent to nearly 50 percent. Bender, Green, and Campbell (3) found that new jobs were taken exclusively by immigrants, incommuters or experienced local workers rather than by less experienced local workers. Hence, much of the research implies that rural development tends to benefit immigrants more than long-term residents.

Previous research has relied principally on small amounts of highly aggregated data on population and employment or looked at small parts of larger rural economies. The ERS studies attempt to provide a more complete analysis by taking a comprehensive look at selected rural labor markets. The analysis reported in this paper compares the labor force participation

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rates, type of employment, and earnings of immigrants and long-term residents living in two rural labor markets. It is part of a more comprehensive analysis currently being prepared in ERS.

### Study Sites

A nine-county area (Clay, Clinton, Knox, Laurel, McCreary, Pulaski, Russell, Wayne, and Whitley) in south central Kentucky was selected as the first study area. The area had 226,800 people in 1980; 30 percent higher than in 1970, and its growth rate was 2 1/2 times the national population growth rate. Total employment in the area grew by 44 percent between 1970 and 1979. The economy is based primarily on manufacturing. The manufacturing sector is comprised of food processing, apparel and textile products, wood products, primary and fabricated metal products, and electrical and nonelectrical machinery.

A ten-county area (Berrien, Brooks, Colquitt, Cook, Echols, Grady, Lanier, Lowndes, Thomas, and Tift) in south Georgia was the site of the second study. The area had a 1980 population of 244,400, 15 percent higher than in 1970. Total employment grew by 24 percent between 1970 and 1979. Manufacturing and commercial agriculture are the basic industries. The manufacturing sector is comprised of wood products, textiles and clothing, and food processing. Peanuts, corn and soybeans are the major commodities produced by the agriculture sector. Unlike the Kentucky area, the Georgia area contains a military installation.

### Survey Procedures

Both the Kentucky and Georgia surveys were conducted using the same survey procedures but they were conducted at different times. The Kentucky survey was conducted in December 1979 and January 1980 while the Georgia survey was done in December 1981 and January 1982. The data were obtained from a sample of firms, government agencies, and households. The private sector establishments and government agencies interviewed were drawn from a list compiled from available information. An area sampling procedure was used to collect information from a sample of establishments not included on the list. Information on ownership, organizational structure, employment, occupational structure, and wages was obtained from private sector firms and government units representing all sizes and types of industry in the respective areas.

A sample of employees drawn from the establishments interviewed was the basis for the household phase of the study. These employees were asked to supply information on household composition, characteristics of household members, employment of all household members 16 years and older, residence history, and household income. An area sample of households was used to gather information about households in which employed members worked in establishments not on the list, and households in which all members were out of the labor force or unemployed. This unique sampling procedure permitted information about a specific industry to be directly linked with information about the industry's employees and their households. All respondent units--private establishments, government units, and households--were asked to provide the requested information for 1974 and 1979 in the Kentucky survey and for 1976 and 1981 in the Georgia survey.

Since the surveys from which estimates are reported were probability surveys, standard errors can be derived for each of the estimates. All statements of comparison appearing in the text are significant at the 95-percent confidence level or higher.

## Results

Results from the establishment surveys describe the private sector establishments and government units that provide employment opportunities. Results from the household surveys describe the resident population and work force. This information provides the context for analyzing the distributional effects of employment growth among long-term residents, immigrants, and recent labor force entrants.

### Industrial Structure

Most establishments, including government, provided services to households and other business both inside and outside the respective study areas (table 1). Over 80 percent of the establishments in both areas were in the private service sector; however, these employers provided less than one-half of the total jobs. Wholesale and retail trade provided the most jobs in the private service sector. Government (Federal, state, and local) was an important employer in both areas. The slightly larger government employment in Georgia most likely reflects the presence of Moody Air Force Base, state colleges and a state hospital in that area. Goods producing establishments provided 30 percent or more of the total employment in both study areas with manufacturing providing most of these jobs. The private sector employment mix in the two study sites at the time of surveys was similar to aggregate U.S. nonmetropolitan employment by major industry group (10).

In both study areas, about 90 percent of the establishments were small, employing less than 20 employees (table 1). However, the few large establishments in the areas provided over two-thirds of the areas' wage and salary jobs.

About 20 percent of the jobs reported by employers in the Kentucky and Georgia areas in the respective survey year did not exist there five years earlier (table 2). New establishments were important in job creation, but one-half of the new jobs in Kentucky and one-third in Georgia were created by on-going establishments. Jansma, et. al. (8) has also shown that new establishments are not solely responsible for job creation and that public policy should not overlook the contribution to employment growth of on-going units.

In both study sites, lower wage establishments and service (private sector and government) establishments provided the most new jobs (table 2). The increase in new service sector jobs is reflective of changes observed in the national economy. In both Kentucky and Georgia, larger establishments contributed over three-fifths of the new jobs (69 percent in Kentucky and 62 percent in Georgia). This result supports those analysts who suggest that large firms play an important role in the job creation process (1).



Table 1--Distribution of estimated establishments and employment by selected characteristics, Kentucky and Georgia study areas

Item	:	Kentucky			:	Georgia	
	:	(December 1979)			:	(December 1981)	
	:				:		
	:	Establish-	Employment		:	Employment	
	:	ments	:	Wage	:	ments	:
:	:	Total:	and	:	Total:	and	
:	:	:	salary:	:	:	salary	
<hr/>							
	:	Number					
Total	:	4,500	53,510	48,510	5,950	73,990	67,690
	:						
	:						
	:	Percent					
Type of establishments:	:						
Goods-producing	:	12	33	35	16	30	31
Manufacturing	:	3	28	30	6	21	22
Other	:	9	5	5	10	9	9
Services-producing	:	83	48	44	81	47	44
Wholesale, retail	:						
trade	:	47	31	28	43	27	26
TCPU, FIRE <u>1/</u>	:	11	6	6	10	8	8
Other <u>2/</u>	:	25	11	10	28	12	10
Government <u>3/</u>	:	5	19	21	3	23	25
	:						
Size of Establishment:	:						
<u>4/</u>	:						
Less than 20 paid	:						
employees	:	92	38	32	90	34	28
20 or more paid em-	:						
ployees	:	8	62	68	10	66	72
	:						
	:	Dollars					
Average weekly wage	:	201	--	--	205	--	--

1/ TCPU is transportation, communications, and public utilities. FIRE is finance, insurance, and real estate.

2/ Includes hotels, personal, business, amusement, health, legal, education, and social services.

3/ Includes Federal, state, county, city or town governmental agencies.

4/ Based on the number of paid full-time employees.



Table 2--Employment change, by selected establishment characteristics,  
Kentucky and Georgia study areas

Characteristics	Kentucky (1974-1979)	Georgia (1976-1981)
	Number	
Total employment change <u>1/</u>	10,850	15,650
New establishments	5,330	10,330
On-going establishments:		
Increasing employment	7,560	8,880
No change or decreasing employment	-2,040	-3,560
Establishment wage-level: <u>2/</u>		
Low-wage	5,850	7,540
Mean-wage	3,250	3,360
High-wage	1,780	4,550
No full-time workers	-30	200
Establishments by type:		
Goods-producing <u>3/</u>	3,200	4,610
Services-producing <u>4/</u>	6,170	8,680
Government <u>5/</u>	1,480	2,360
Establishments with:		
Less than 20 paid employees	3,360	5,960
20 or more paid employees	7,490	9,690

1/ Includes both wage and salary and self-employed positions.

2/ Based on average wages paid to full-time workers working 30 hours or more per week. Mean-wage establishments paid full-time workers average weekly wages within a range determined by adding and subtracting 10 percent from the average weekly wages paid by all establishments in the respective study sites. Low-wage establishments paid full-time workers average weekly wages less than 10 percent below the average weekly wages paid by all establishments. High-wage establishments paid full-time workers average weekly wages greater than 10 percent above the average weekly wage paid by all establishments.

3/ Includes manufacturing, construction and mining.

4/ Includes wholesale and retail trade; transportation, communication, and public utilities; finance, insurance, and real estate; hotels, personal, business, amusement, health, legal, education, and social services.

5/ Includes Federal, state, and local government units.

## Residents

The ethnic composition of the population was considerably different between the Kentucky and Georgia areas. In Kentucky, the population was almost exclusively White and not of Hispanic origin. In Georgia, about 32 percent of the population was Black. The age structure of the population in the two sites was quite similar.

Both areas had experienced considerable immigration with about one-fourth of the resident adult population having moved to the respective area in the last 15 years. One-half or more of the immigrants had moved to the areas during the last five years. However, the majority of the immigrants were return immigrants, that is, they had lived in the area at one time, moved away, and then returned within the last 15 years. In Kentucky, about 70 percent of the immigrants were return immigrants, and in Georgia, about one-half were return immigrants. Thus, in both areas and particularly in Kentucky, many immigrants were not "strangers" to the study site. This result tempers the popular notion that rural employment growth benefits outsiders, not the indigenous population.

The labor force participation rate at the time of the survey was 51 percent for Kentucky and 60 percent for Georgia. Labor force participation in Kentucky was substantially below that for all U.S. nonmetro areas while that in Georgia was about at the nonmetro national average (10). Kentucky had a unemployment rate of 11 percent, substantially higher than the 8.5 percent rate found in Georgia. When comparing the employment levels in the two areas, it should be noted that the two surveys were conducted at different points on the national business cycle. Also, the local business cycle of the two areas may differ from the national cycle and from each other. No attempt was made to adjust the employment and unemployment data for these factors.

Household incomes were higher in the Georgia area (\$15,200 in 1981) than in the Kentucky area (\$11,980 in 1979). This was true even after adjusting the Kentucky income data for nonmetro household income growth at the national level between the two survey years. Yet, both areas had average household income considerably below that of all nonmetropolitan areas for the respective survey years despite impressive employment growth in recent years. The reasons for this apparent inconsistency are currently being explored in a detailed analysis of the impact that employment growth has had on household income and poverty status in the study areas.

## Who is Employed?

The survey data provide somewhat different conclusions about the extent to which long-term residents competed for jobs in growing rural labor markets. The results from Kentucky indicate that long-term residents successfully competed for jobs with immigrants as evidenced by the fact that employment rates among the three residency groups are not significantly different (table 3). Recent immigrants had a higher labor force participation rate than long-term residents but they also had the highest unemployment rate of the three residency groups. Thus, recent immigrant labor force participants appeared to have the most difficulty finding employment in the Kentucky area at the time of the survey. However, recent

Table 3--Selected characteristics of the adult population by residence status, Kentucky and Georgia study areas

Characteristics	Residency status <u>1/</u>					
	Kentucky (January 1980)			Georgia (January 1982)		
		Early	Recent		Early	Recent
	Long-term residents	inmi- grants	inmi- grants	Long-term residents	inmi- grants	inmi- grants
	Number					
Total adult population	95,220	16,610	17,450	115,290	14,930	20,900
	Percent					
Employment status:						
Employed	44.3	47.1	49.1	51.3	68.3 *	63.0 *
Unemployed	4.5	5.7	12.1 *	5.1	4.0 <u>3/</u>	5.6 <u>3/</u>
Out of labor force	51.2	47.1	38.8 *	43.6	27.7 *	31.4 *
Labor force participation rate	48.8	52.9	61.2 *	56.4	72.2 *	68.7 *
Unemployment rate	9.2	10.8	19.8 *	9.1	5.4	8.1
Employed workers major occupation:						
Executive	13.1	17.4	20.9 *	12.6	23.4 *	19.1 *
Technical	45.6	42.8	38.0	49.1	45.7	42.9
Production	41.3	39.8	41.1	38.3	30.9 *	38.0
	Dollars					
Average weekly wage <u>2/</u>	198	235 *	184	223	265 *	283 *
	Years					
Average age	39.5	37.3 *	31.2 *	38.9	39.3	33.3 *
Average education	11.1	12.2 *	12.2 *	11.3	12.6 *	13.2 *

1/ Long-term residents resided continuously in the respective study sites for the 15 years prior to the survey. Early immigrants moved to the study area between 6 and 15 years from the time of the survey. Recent immigrants moved to the study area within five years prior to the time of the survey.

2/ Based on full-time wage and salary workers.

3/ To few observations to test for significant differences.

\*/ Significantly different from long-term residents in the respective study site.

immigrants did have an advantage over long-term residents in obtaining executive and related jobs. This may be due in part to immigrants having more years of formal education. The proportion of workers in technical and production occupations was not significantly different between each group.

The apparent advantage Kentucky recent immigrants had in obtaining executive and related jobs did not necessarily result in higher average weekly wages for recent immigrants relative to long-term residents. Only the average weekly wages of early immigrants were significantly higher than those of long-term residents. There was no significant difference in average weekly wages of long-term residents and recent immigrants. Many of the early immigrants may have more of the higher salaried jobs because they moved to the area at a time of rapid expansion of both new manufacturing and other establishments specifically to take managerial and highly skilled jobs. Over one-third of the manufacturing and 30 percent of the other establishments began operations under current management between 1965 and 1974.

Results from the Georgia survey provide a somewhat different picture (table 3). Long-term residents had significantly lower employment and labor force participation rates than either early or recent immigrants. In contrast to Kentucky, both early and recent immigrants in Georgia held proportionately more executive and related jobs than did long-term residents. Also in Georgia, this difference was reflected in higher average weekly wages both for early and recent immigrants relative to long-term residents. Thus, all major measures of labor force status showed that immigrants in the Georgia area had an employment and wage advantage over long-term residents in the local labor market. Part of the reason immigrants may have fared differently in Georgia than in Kentucky is that the Georgia site may be in an earlier phase of its development process than Kentucky. In the early phases of development, immigrants may have a particular advantage in the local labor market. The manufacturing sector in Georgia is of a more recent origin than in Kentucky. Over two-thirds of the manufacturing establishments in Georgia began operations under current management after 1970, compared to 25 percent in Kentucky.

Survey sampling procedures permitted data collected through the household survey for some employed persons to be directly matched or linked with information collected through the establishment survey about the establishment for which they worked. Four main establishment characteristics were examined to see if they were related to residency status, race, and labor force experience of employees. These characteristics are wage level, type of industry, number of paid employees, and employment change over a five year period.

In both Kentucky and Georgia, there were no significant differences in the proportions of long-term residents and immigrants employed by type of industry or by size of establishment (table 4). However, in Kentucky, long-term residents were more likely to be employed in low-wage establishments than were immigrants. Immigrants were more likely to hold jobs in mean-wage units, and there was no significant difference between the proportions of each residency group employed in high-wage establishments. In contrast, in Georgia there were no significant differences in the proportions of long-term residents and immigrants employed by establishment wage



Table 4--Selected characteristics of linked wage and salary employees by residency status, Kentucky and Georgia study areas 1/

Characteristics	Residency status			
	Kentucky (1979)		Georgia (1981)	
	Long-term residents	All <u>2/</u> immigrants	Long-term residents	All immigrants
	Number		Percent	
Total linked wage and salary employees	30,400	10,970	40,920	14,950
Establishment characteristics:				
Wage category:				
Low-wage	39.5	28.1 *	35.3	26.8
Mean-wage	32.9	42.4 *	22.7	24.3
High-wage	27.6	29.5	42.0	48.9
Type:				
Goods-producing	36.1	34.3	37.5	31.1
Services-producing	38.5	37.3	37.0	35.9
Government	25.4	28.4	25.5	33.0
Size:				
1 to 19 paid employees	40.8	35.5	30.7	28.9
20 or more paid employees	59.2	64.5	69.3	71.1
Employment change:				
New establishments	9.2	7.9	11.0	9.6
Growth establishments <u>3/</u>	58.2	75.8 *	56.0	62.9
No-growth establishments <u>3/</u>	32.6	16.3	33.0	27.5

1/ Wage and salary workers sampled from the employment roles of the surveyed establishments.

2/ There were too few observations to show data for early and recent immigrants.

3/ Represents private and public on-going establishments.

\* / Significantly different from long-term residents in the respective study site.

level. Results from the Kentucky survey show that long-term residents were able to obtain jobs in new establishments and those expanding their work force but the proportion of inmigrants employed in these units was greater than that of long-term residents. In Georgia, there was no significant difference in the proportions of long-term residents and inmigrants employed by new, growth and no-growth establishments.

Of particular concern in the Georgia study was the extent to which Blacks participated in that areas's employment growth. Most major measures of labor force status suggest that Blacks did not fare as well as Whites in the local labor market. The labor force participation rate for Black adults was not significantly different from that for Whites, but Black adults had a significantly higher unemployment rate. Employed Blacks were more likely than Whites to have production occupations, and Blacks were less likely to hold executive positions. And, the average weekly earnings of Blacks was about three-fourths that of Whites. Nonetheless, Blacks were able to obtain their proportionate share of jobs in establishments expanding their work force, particularly among expanding on-going units.

An important premise underlying rural development policy is that employment growth in rural areas extend job opportunities to persons having little labor force experience. About one-quarter of the workers employed in the Georgia site during the survey year were not employed five years earlier, while in Kentucky, these recent entrants accounted for about 30 percent of the work force. In both Georgia and Kentucky, the proportion of recent entrants who were long-term residents was about equal to the proportion of long-term residents in the adult population.

In both study areas, about 60 percent of the recent entrants were youth, persons 16 to 24 years old, at the time of the survey. Further, about 60 percent of the recent entrants were women. Recent entrants were more likely than experienced workers to be wage workers, work part-time, hold lower paying jobs primarily in technical occupations, be employed in low-wage establishments, and work in the private service sector. Recent entrants in the Kentucky site were more likely than experienced workers to be employed in new and growing establishments, while in the Georgia site, there was no difference in the proportion of recent entrants and experienced workers employed in new and growing establishments. Thus, it appears that those establishments providing new jobs in both areas enhanced the ability of persons with little recent labor force experience to find employment.

#### Concluding Comments

These studies provide some important insights about the rural development process when rural development is viewed from the context of employment growth. Rural employment growth provides employment opportunities for local residents and for persons with limited labor force experience. On the other hand, the studies provide mixed results regarding whether or not long-term residents compete successfully with inmigrants for all jobs in an expanding rural labor market. In the Georgia site, inmigrants had higher employment rates, higher labor force participation rates, held a disproportionate share of the better paying jobs, and had higher weekly wages than long-term residents. In Kentucky, there was no dif-

ference in the employment rates of long-term residents and immigrants but recent immigrants held a disproportionate share of better paying executive jobs. Also, immigrants held a disproportionate share of jobs in growing establishments than did long-term residents. We are currently analyzing the data in more detail to determine the factors which explain the observed differences in labor market status by residency categories. A third growth study to be conducted in 1984 in a recreation/retirement area in northern Arkansas and southern Missouri will provide yet additional information on this topic.

Conclusions about the extent to which rural development affected household income must await further analysis of the data. But, preliminary information presented here suggests that recent employment growth in the study areas has not totally ameliorated the area's income problems. Part of the reason for this is that not all households participated in the employment growth. In addition, much of the recent job growth, particularly in the private sector, was in low paying jobs. But, the apparent conflict in attempting to enhance income levels through efforts to expand lower paying jobs in the service sector is a problem inherent in the national economy and not a problem unique to the study areas.

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Most of this conference has focused on prospects for 1984. In this session we are taking a longer term view of some directions agriculture may be going and the forces shaping those directions. In this paper I want to set the stage for the longer term by first putting in perspective where we are today and prospects for the rest of this decade. Then I select four broad areas of development which will certainly be critical in the evolution of agriculture over the rest of this century. I close with a few speculative comments about agriculture in the 21st century.

#### Current Situation and Near Term Prospects

The experience of the 1970's led many of us to believe there would be continued strong growth in demand for U.S. farm products in the rest of the world. We knew there would be occasional, unpredictable shocks from weather, economic and political sources. But the underlying trends suggested consumption would grow faster than production in the rest of the world, leaving the world increasingly dependent on the U.S. for food supplies. The possibility seemed strong that our exports could rise faster than yields were increasing, meaning both expanded acreages and rising commodity prices. Parenthetically, we did warn that the potential for price instability was great and that many highly leveraged producers were vulnerable to the cash flow problems associated with instability.

A number of forces were at play in the seventies that led us to these conclusions. Incomes were high and rising in the developed world. In the OPEC and middle income countries, incomes were also rising rapidly. These rising incomes were translated into effective demand for upgraded diets. In many of the poorer countries of the world food imports were also rising. Over the decade of the seventies there was a gradual decline in the value of the dollar, making our goods even more attractive to foreign buyers. There were large credit flows, public and private, to Eastern European countries and to the middle income countries, financed in part by the huge surpluses of OPEC money flowing to financial institutions in developed countries. These credit flows enhanced demand for U.S. farm products directly, by financing food purchases, and indirectly through the economic growth they stimulated.

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On the supply side, it appeared that a number of factors might begin to slow the rapid increases in crop production experienced in the U.S. as well as in other countries: most of the good land was in production; the easily developed irrigation land had been developed; energy prices were rising rapidly; hence, fertilizer and irrigation costs were being driven up; and no new major technological breakthroughs were imminent.

Today, trade prospects seem considerably less promising, at least for the next several years. What happened? The major unseen development has been the deep and prolonged global recession. A number of factors contributed to the recession and to its depth and duration. In the seventies the whole world was on an inflationary fast track, a kind of economic pyramiding that had to keep growing at an increasing rate or collapse. The U.S. recession, deepened by our attempts to get inflation under control, may have punctured the balloon. In an integrated world economy, the slowing of growth in a major nation such as the U.S. has a domino effect, first on our major trading partners, and then on the rest of the world. Slowed growth in the developed world meant sharp reductions in OPEC oil exports which not only reduced OPEC's ability to import but also eliminated a major source of credit for financing development in the rest of the world.

The slowdown in the global economy concurrent with slowdown in credit flows left many East European and Latin American countries in untenable debt positions. The threat of debt payment defaults further discouraged both private credit and credit from governments and institutions such as the World Bank. Countries short of foreign exchange necessary to meet debt payments acted to sharply curtail all but essential imports. All these logical actions and reactions caused the global recession to feed on itself.

To complicate the situation, the slowed rate of U.S. inflation, relative to the rest of the world, stopped the erosion in the value of the dollar. Our high interest rates, which at least partially reflect large budget deficits and restrictive monetary policy, combined with the relative economic and political security of the U.S., made the dollar very attractive. As a result the dollar has appreciated sharply since 1980, making our farm products much less attractive in other countries. For example, on a trade weighted basis, the real value of the dollar has appreciated nearly 30 percent for importers of U.S. corn and more than 15 percent for importers of U.S. wheat since 1980. Our analysts estimate that the stronger dollar cost the United States about \$6 billion in lost farm export sales over the past two years.

We also have learned that the production capability of the world is greater, or perhaps more responsive to market pressures, than we earlier thought. Some of the higher incomes and large credit flows in the seventies were invested in productive capacity, here and abroad, which began coming on stream in the late seventies and early eighties. Energy prices and production costs rose less rapidly than we had earlier expected. And, we learned that farmers the world over can and do respond to economic incentives by increasing output.

Prospects for the remainder of the 1980's, while highly uncertain, currently look something like this:

U.S. agriculture's capacity to produce could expand at a rate of up to 2 percent per year on the basis of productivity gains alone. This productivity growth, combined with full use of the 80 million acres of cropland currently idled and the gradual conversion of 20-30 million acres of land suitable for cropping but currently unused, puts the farm sector in a position to potentially expand output about 40 percent by the early 1990's. Past productivity growth and land use patterns suggest that an increase of this magnitude could be compatible with slowly declining real farm prices. The unprecedented capacity gains of the 1950's and 1960's were actually made during a prolonged period of declining real prices. Capacity could well expand at an even faster pace with constant or rising real commodity prices.

Prospects for growth in domestic and foreign demand for U.S. farm products currently seem less favorable. Growth in domestic demand for farm products has weakened over the last 4-5 years with recession and relatively high unemployment. Equally important, per capita consumption of most farm products in the United States is fast approaching saturation levels. For example, changes in meat demand patterns with increased dietary concerns have slowed growth in one of the fastest growing food sectors of the 1960's and early 1970's. As a result, even with the return to stronger macroeconomic growth later in the 1980's, domestic demand for farm products could lag, perhaps growing at less than 1.5 percent per year on average. This growth rate is somewhat less than likely growth in productivity and well below the sector's capacity to expand production if available land resources were to be used more fully.

Prospects of growth in the export market are more favorable than domestic demand prospects but less favorable than the growth in exports experienced over the last 15 years. Recovery from global recession will be slow and gradual; hence, incomes and demand will increase slowly. Creditors will be much more cautious over the next several years, thus reducing a major source of potential growth. Petroleum sales and prices are likely to show more modest growth than in the seventies, thus holding down costs but also reducing a major source of income and credit that once financed world trade in farm products.

While food demand growth abroad recovers slowly from the low levels experienced so far in the 1980's, growth in food production abroad should pick up as many of the investments in infrastructure and productive capacity made during the middle and late 1970's come on-line. Equally important, fewer countries are likely to be in a position to convert demand left unfilled by local production into commercial imports. Foreign exchange reserves in many countries are stretched to the breaking point and several years of recovery will be necessary before the financial base for any significant expansion in trade is in place. As a result, growth in world import demand could well be about half the pace we grew accustomed to over the last 15 years.

The U.S.'s competitive position in this weak world market is also unlikely to improve significantly until later in the decade. With the dollar likely to remain strong so long as the U.S. continues with large Federal deficits and high interest rates, any improvement in the U.S.'s competitive position will be gradual. On balance, U.S. export volume could grow at 3-4 percent per year in the 1980's compared with 8-10 percent per year in the 1970's.



Hence, overall demand for U.S. farm products here and abroad could expand at 2-3 percent per year, a rate of increase about the same as expected productivity growth--but not enough to bring all of the acreage currently idled back into production. Critical from our perspective here today is the probability that the market place will not be able to generate commodity prices comparable to those provided for in the 1981 Farm Bill with production and resource use anywhere near record 1981-82 levels.

I would be amiss if I did not reemphasize the instability element underlying this picture of excess productive capacity over the decade ahead. The rapid deterioration in trade prospects and the unusually good yields enjoyed over 2 of the last 3 years points not only to potential surplus problems but to a problem of instability as well. Foreign and U.S. crop yields both seem to be becoming increasingly unstable. This could be due to a combination of increasingly variable weather and the use of resources which are more sensitive to normal weather fluctuations. Macroeconomic conditions abroad have also become considerably less stable and their impact on world import demand is a growing source of uncertainty for an export-oriented U.S. agriculture. Swings in supply and demand as pronounced as the shifts experienced over the 1978-1980 and the 1981-83 period could well become commonplace.

Hence, the outlook for the 1980's is probably best characterized as one of growing uncertainty with a strong tendency toward excess supply, possibly interrupted by years of tight supplies.

#### Forces Shaping the Intermediate-Term Future of U.S. Agriculture

Agriculture 2000! Sounds like something out of science fiction--very futuristic--too far into the future for practical people to worry about. But, its only 16 years away, really more intermediate term than long-term. Look back 16 years to 1968: the Vietnam War was raging, Lyndon Johnson was ending his Presidency, and the Russian wheat deal and the decade of booming agricultural exports were looming immediately ahead. How fast those years have passed. 2000 A.D. is not far away. Agriculture at the end of the century will likely be shaped by seeds already planted.

No one can predict exactly what agriculture will be like at the end of the century nor the exact path from now to then. But we can identify some of the forces currently at play which will certainly be important over the next decade or two. I have selected four to highlight:

- o agriculture's linkage to world markets;
- o agriculture's linkage to the macro or general economy;
- o technology, productivity and resources; and
- o farm and food policies.

#### Linkage to World Markets

U.S. agriculture will remain heavily involved in world markets; substantial withdrawal to domestic markets is unrealistic. Domestic food demand is relatively flat, growing roughly in line with population growth. With yields growing faster, crops harvested for domestic use dropped from 315 million acres in 1949 to 228 million acres in 1981. By 2000 we could require as little as half the current cropland base to meet domestic needs. The output of two-fifths of our acres now goes to exports. Withdrawal from



world markets would mean dramatic and costly reduction in farm employment and reduced utilization of the U.S. farm plant--costly in terms of disinvestment by farmers, reduced farm asset values, taxpayer costs of production adjustment programs, loss of sales in farm input markets and product markets, and loss of net export earnings to the U.S. economy.

In contrast to flat domestic demand, global demand for food is growing, albeit not as rapidly as expected at the end of the seventies. Moreover, that demand is price responsive, especially over the longer-term. If that price responsiveness is as great as some think, for some crops there may eventually be the possibility that rising productivity in the U.S. could translate into rising net revenues rather than more adjustment problems.

Moreover, global demand for food is income responsive. This is especially true in the developing and middle income countries. To the extent that there is economic recovery in the world generally and economic development in the poorer countries in particular, food imports will grow, and the U.S. has an opportunity to share in that growth.

But, success in world agricultural markets will be a real challenge. First, these markets are not like domestic markets. There are few international rules; only the domestic policies of 100 plus trading nations of the world. Second, some major exporters who compete with us come to the international market with the objective of seeking relief from problems generated by internal domestic agricultural policies. The U.S. is not immune to that temptation. There are essentially no totally free trading countries in the world. All countries have policies that in some way restrict or discourage certain imports and underwrite or subsidize certain exports. The differences among countries are matters of degree, although some of these differences are large and significant. Third, and as a consequence, there is a high probability that between now and the year 2000, competition could be fierce at times. This fierce competition could put great pressure on domestic policies and institutions in the U.S. and elsewhere.

A critical characteristic of export markets is that they are less stable than domestic markets. The instability arises from the thinness of trade relative to total world production and consumption. Hence, small percentage changes in world production translate into large percentage changes in the residuals traded. The natural (weather) causes of this volatility are abetted by country policies and episodic political events. Whatever the causes, the outcome is that U.S. farmers, indeed any agricultural producers who are residual suppliers to the world market, are whiplashed by these ups and downs in demand. Producers' consequent fortunes and misfortunes reverberate through the surrounding agricultural industries. This instability is a price we must pay to trade in world markets, and we must be prepared to deal with the internal implications with intelligent domestic policies.

Over the rest of this century, trade issues will present our farmers and their policymakers with difficult choices. Domestic markets require less and less of our productive capacity while foreign markets are fiercely competitive, unstable and unpredictable. There are no easy solutions which assure prosperity to farmers and serve the best interests of this nation and the world.

Nevertheless, there are some things we can and must do if we are to be successful traders in a "managed trade" world:

- o Our domestic farm policies have to be strategically and economically consistent with the realities of world markets. This means our farm programs must be flexible and responsive to unpredictable global market developments; they must be sensitive to the price responsiveness of global demand; they must assure that we be a reliable supplier at competitive prices; and they must deal with the instability issue and the sharing of risks between farmers and the public.
- o Our fiscal and monetary policies have to be consistent with trade objectives.
- o Our overall national trade policy must be consistent and enlightened. We cannot be free-traders for some products or industries and protectionists for others.
- o Consequently, a commitment to expanded trade and global linkages means we must be prepared to make tough internal adjustments. If we want to sell, we must be prepared to buy. We likely have some industries and commodities that are not competitive and will shrink or succumb under free trade pressures.
- o We must be more astute traders.
- o We need to add more value to our exports through further processing where we have comparative advantage in processing.
- o We must come to realize that it is in our enlightened self-interest to support and contribute to a healthy global economy.

Agriculture's linkage with world markets has implications beyond agricultural exports. It is but a part of the growing interdependency of the countries of the world. When one country coughs, others catch cold, and some catch pneumonia. When the U.S. put the brakes on inflation, the world was plunged into recession. The domestic rural structure policies of the EC impact directly on our farm export sales.

The near term policy challenge for the U.S. is to figure out how we can enhance the U.S.'s export position while expanding the overall size of the market and improving the operation of world markets. The longer term challenge is that of determining the level of exports and the characteristics of export policy which will serve our overall national interests. How we do this will have a lot to do with what U.S. agriculture is like in 2000.

#### Agriculture's Linkage to the General Economy

Events of recent years have shown U.S. farmers just how much stake they have in macro or general economic policy (fiscal and monetary). This is a complicated subject that cannot be treated in detail here. Let me deal quickly with a few points pertinent to the future of U.S. agriculture.

First, one cannot treat the components of monetary and fiscal policy separately; they are interrelated. For example, one cannot focus concern on interest rates alone, because interest rates link to money supplies, budget deficits, inflation, tax policy, dollar strength and a host of other factors in complex ways. Without dealing with these linkages, farmers could push for actions, say lower interest rates, that appear to be in their best interest, but which lead to negative indirect effects which more than offset the direct gains.

You know all too well the pain of high interest rates and the distortions of rapid inflation. You are now experiencing the withdrawal pains of trying to come off our inflation "high." Let me walk you quickly through some key linkages.

We have a large federal budget deficit. As a nation we have not yet come to grips with whether we will close that deficit by reducing expenditures or increasing taxes or some combination of the two. We seem to be in a state of political paralysis over this issue. But the future of our economy depends on resolving it.

A federal deficit can be financed by monetizing it (printing more money) or by borrowing from private capital markets. Printing more money creates excess demand and is the primary source of inflation. To minimize the danger of refueling inflation, especially after going through so much pain to get it under control, the Federal Reserve (the monetary policy authority) has chosen to hold down the growth in money supply. Hence, the deficit is being financed by the government going into the money markets and borrowing in competition with private borrowers. But the deficit is so large relative to the total loanable capital available that the fierce competition for money drives up the price (interest rates). Inflation is kept in check but farmers are affected in several ways:

- o High interest rates increase the cost of doing business and increase cash flow problems for heavily debt-leveraged farmers.
- o High interest rates discourage investment, slow economic growth, hence reduce domestic demand for farm products.
- o High interest rates make it attractive for other nations to hold dollars; the competition for dollars in world markets drives up the value of the dollar, makes our exports more expensive to others, and thus reduces farm export sales.
- o High interest rates attract foreign capital, and the drain on that scarce capital reduces U.S. farm exports by reducing funds available to other countries to pay for imports and, indirectly, by reducing the capital other countries have available for internal investments and growth.
- o High interest rates worsen the credit problems of debt-ridden countries and make it more difficult for other countries to borrow for internal investment. In both cases the net result is reduced ability to import U.S. farm products.



Again, we could lower the interest rates and reduce the above problems by printing more money and running the risk of rekindling inflation. Clearly, we are riding a tiger and intelligent policies combined with political will are required to dismount without being eaten. The point for this conference is that how all this is resolved (or not resolved) could mean more to American farmers in the long-run than the 1985 Farm Bill (although that, too, is terribly important).

One other point. Because of the size of our economy, a U.S. recovery is important to recovery overseas. It is necessary that we be strong and that we import if others are to recover and thus be able to import from us.

Thus, U.S. agriculture in the future, because it is heavily linked to global markets, and because demand in these markets is so responsive to incomes and economic conditions, will be very much shaped by the characteristics of the global economy. Those characteristics in turn depend not only on the monetary and fiscal policies of other nations, but also on the ripple and feedback effects of U.S. economic policies. Because of the strong linkage of U.S. fiscal and monetary policies to the global economy, whether and when the U.S. comes to grips with huge budget deficits, and how the Federal Reserve responds to those deficits could have more impact on U.S. farmers during the rest of this century than any other single factor.

#### Technology and Resources

Some would argue that technology is the single most important driving force in the evolution of agriculture. That is perhaps true, although it is impossible to clearly separate the effect of technology per se from the interaction of technology with institutional and economic circumstances.

Most of the improvements in technology in agriculture get translated into the rate of increase in total factor productivity. Productivity growth, as measured by total farm output per unit of input, has slowed--from a growth rate of 2.4 percent per year in 1950-65 to 1.7 percent per year in 1965-82. This reflects the end of the exodus of labor from agriculture, the elimination of slack resources in agriculture, and the more intensive use of purchased inputs in crop production. The rate of productivity growth during the rest of this century will be critical to supply/demand balances. These balances in turn will affect the economic well-being of agriculture and hence policy objectives.

Some who understand that the domestic demand for food is not very responsive to changes in prices or incomes suggest that technology is the culprit and that farmers would be better off if we let productivity grow more slowly. This would reduce output, tighten the supply/demand balances, and raise commodity prices and farm income. That would be a short-sighted policy. I am convinced American society, including farmers, is better off today than it would have been if technology and productivity had been frozen at 1950 levels, for example. Moreover, any major nation that does not maintain investment in research and science is gambling with its future and competitive position.

One lesson we have relearned many times is that farmers do respond to economic incentives. This suggests that productivity and capacity potentially



could be increased tremendously simply by changing the mix of land use--i.e. drawing in unutilized land and shifting underutilized land to a higher value mix of uses. Higher prices would also draw in greater nonland capital to add to the land. In short, the demand for technology is price responsive. This suggests we can expand exports faster than we once thought without running into capacity constraints.

Technology defines the possibilities for the organization of production. Thus, technological development between now and 2000 will influence the way farm businesses organize to produce early in the next century. Such developments could determine the control and coordination structure within agriculture and between agriculture and other sectors.

One technology that will certainly have profound impacts on farming (and on everything else) is the new electronic information technology. It will likely affect how farmers plan, manage, produce and market. It will certainly affect Extension's role and could impact in major ways on collection and dissemination of statistics and economic analyses. Information technology will beget management technology. Farmers may be able to manage more resources and do it better--probably reducing the managerial cost of existing output levels. I believe that this technology will generate a lot of excitement and change, but where it will take American agriculture is not at all clear.

If the scenario of modest growth in demand is a reasonable one for much of the rest of the century, I believe there will be, and should be, some shift in the focus of research towards conserving our resources and using them more efficiently. Already irrigation research has shifted from development to water conservation. The next round of research could focus on breeding plants to make more efficient use of water. Other examples include research on more energy efficient technology, environmentally safe technology, and improved livestock management systems, especially for beef.

On the resources side, continued emphasis will be put on soil conservation, but research will likely help refine that emphasis by helping refine relationships between soil loss and future productivity, for example. Water is likely to emerge as a greater and more immediate concern. Depending on how that concern is manifested and the response of the political process to it, some constraints could be placed on production agriculture.

Obviously, major breakthroughs in the development of industrial uses of agricultural commodities could change the overall demand picture and financial outlook.

#### Agricultural and Food Policy

There is high probability that demand for U.S. agricultural products will not be strong enough to take the slack out of production capacity at prices near or above current target prices. There is also growing awareness of the importance of price in world markets. How the body politic chooses to reconcile this information is critical to the character of U.S. agriculture in the rest of this century. It could determine not only price levels, but how they are set, who will produce and where. The trade-offs are between high support prices and figuring out how to deal with the negative side

effects of that versus lower supports or a market-oriented policy and figuring out how to cope with the negative aspects of that.

Along this same line, there is a growing awareness that domestic farm policy and trade policy are inseparable. Thus, more lawmakers are sensitive to the trade and competitive implications of domestic policy tools.

There is evidence of a greater interest in consistency among commodity, credit, and resource policies to assure that they are not working against each other. Consistency is eminently sensible but may impose some new constraints (and costs) on farmers (such as cross compliances, and loss of subsidized credit). Any commodity policy that supports wise use of the nation's land and water resources should be predictable and recognize the importance of market forces. The constant changing of programs is a major source of uncertainty, hence inefficiency.

There is a growing awareness that American agriculture has changed. In 1982, there were only 298,000 commercial farms with sales of \$100,000 or more producing 68 percent of the total farm product. The operators of the remaining small farms generally are not poor, do not depend solely on farm income and benefit little from traditional commodity programs. These factors could change the public's perception about agriculture and could therefore affect the public's views and support of farm programs that essentially result in transfer payments. Many of the commercial farms can be competitive in the world markets but may be hindered by present policies. There may be more questions about the objectives of the farm programs and who benefits from these programs.

The next farm bill is critically important. Lawmakers will have to grapple with such questions as: how do you protect the efficiency generated by a market-oriented agriculture while avoiding or minimizing its instability? How much instability is too much? In an increasingly risky environment, what is the appropriate public/private sharing of risks? How these questions are answered will set the course of policy (and trade) for the second half of the 1980's and set the stage for the 1990's.

#### Longer Term Considerations

Beyond the end of this century, a number of developments could combine to dramatically alter agriculture's prospects and characteristics.

First, there is the possible phenomena of maturing food and fiber markets. In the developed world food consumption is now relatively stable, i.e. relatively price and income inelastic. As development takes place in today's poorer nations, food consumption will first rise to meet basic dietary requirements, then volume increases will slow while food expenditures continue to rise as consumers upgrade their diets to include more preferred foods. Eventually, per capita food consumption could stabilize, meaning aggregate growth in world markets would roughly parallel population growth. Add to this the possibility of stabilizing global population, perhaps in the second quarter of the next century, and the result is a relatively flat world demand for food and fiber.

That possibility conjures up a number of scenarios. One is that of fierce competition for fixed markets. More likely, as economies of countries and regions mature, specialization will increase and comparative economic advantage will dictate a gradual redistribution of the fixed agricultural market. The competitive position of U.S. agriculture, and whether its share of that market will grow or shrink, will be influenced importantly by what happens between now and 2000 in terms of the four groups of influences discussed earlier. Especially important will be whether our technology stays at the leading edge and our policies encourage an efficient and competitive farm industry.

There is the possibility for development of major new uses for agriculture's productive capacity in the longer run. A prominent prospect is that of looking to agriculture as a source of "renewable" resources in lieu of further mining of dwindling "stock" resources. Biomass fuels may become economical, and industry may turn to agriculture for a wide variety of "renewable" raw materials. In this case, agriculture might become proportionately less of a food industry and more a supplier of industrial raw materials. If so, it is not difficult to imagine new control and organization linkages of agriculture with nonfood industrial firms.

But, the potential depletion of "stock" resources, including fertilizer minerals and groundwater supplies, suggests that eventually--perhaps within the next 30 to 50 years--agriculture too must adjust to the loss of these resources. This means an agriculture less dependent on supplemental water and nutrients from petroleum or mined sources. Plant breeding may need to focus on development of plants that thrive on native or natural environments. An example might be improving productivity by breeding plants that thrive on dryland conditions rather than depending on irrigation to maintain yields. I believe that basic scientific research should focus on this need very soon in order to have the technology needed when our water and mineral resources run low. Pressure on resources also implies an increasing trend to use existing farmland more intensively compared to the extensive use of cropland today for grain and oilseed production.

Finally, out there in the 21st century, in the lifetime of many here today, agriculture will continue to be a very important industry--but fewer people may identify with farming as a way of life. For most Americans, that will be a part of our folklore, like the old West. The commercial agricultural industry likely will focus on around a quarter to a half million or less relatively large business units. But, small scale agriculture will thrive around the edges, adding a kind of pluralism to the industry.



## PROBLEMS AND POTENTIALS OF GENETIC ENGINEERING

Lawrence Bogorad, Professor, Harvard University  
1984 Agricultural Outlook Conference - Session 35

Transcription of remarks made November 3, 1983

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DR. BOGORAD: Thank you, very much. It's a great pleasure to be here, and I know that what I should do, in view of what the title of this meeting is, is to tell you all about what genetic engineering and other technologies will do for, or to agriculture by the year 2000, or by the year 1984.

What I can say is, of course genetic engineering and other bio-technologies will contribute. I think I'd like to give you an idea of what that might be, and what I'll try to do is tell you some things that are happening now, and try to give you an idea of what may be going on in the future.

If I may have the first slide, please. Well, I don't need to tell a group of this sort that the bottom line is the line that counts. That is, to reduce production costs and keep productivity up. And so, of the sort of three major goals, obviously, that's really the point, as Dr. Lee was pointing out.

Now, what I have on this next slide is is simply the biological components of a crop system, on the left hand column. Pointing out, of course, it consists of crop plants, weeds, animals, fungi, all of the organisms that live together. And, pointing out on the right, what



some of the current technological interventions are to improve agriculture, by improving productivity, of course.

The first of these is plant breeding and selection, which I think you all know very well. And the next slide simply points out some of the limitations of present breeding and selection systems for crop improvement. You can think of the limitations in two ways; one is a quantitative limitation. It takes a long time to breed in a new character. My friends in the corn breeding business tell me it's 7 or 8 years from the time one has a character, until the time you get it into harvestable crop plant.

And then there's really the more difficult side of it, and that I've called the qualitative side. And that is, that sometimes the gene that you want to get into the plant, simply doesn't exist in the breeding population. There isn't another organism. There is not another organism available which you can cross with it to bring the gene in. So, those are two of the limitations of that aspect of the problem.

Now, with regard to the other kinds of technological interventions, we can put the rest of them essentially in a single category. And those items are growth regulators that affect the crop plants directly, herbicides that affect the weeds, insecticides and other things that counteract the animals -- insects, of course, fungicides

that kill off the fungi, and things that kill off the bacteria. And all of those, really, are within the range of agricultural chemicals.

The limitation to that side of the technological intervention, is that it is largely an empirical operation at least at the beginning. There is an observation that a particular compound will kill a particular weed, and not the crop plant, and so on.

And then from there on, the agricultural chemical industry runs a kind of a shotgun, or at least a poorly aimed rifle operation, of trying to make compounds that look like that one -- testing them out, hoping to find what the rules are for what makes a better, and better compound. And some of those rules are available, but still it's mostly an empirical operation that becomes more and more expensive as testing -- and this becomes expensive. And the people in agriculture chemicals are pretty smart people, and realize that they'd be better off if they could rationally design herbicides and other agricultural chemicals, and that is the goal of that industry.

So, again, the kinds of technological interventions include breeding and selection, on the one hand, agricultural chemicals on the other, and I've left out a lot of other things, including various kinds of agricultural practices. But those are the two, particularly, that I

want to deal with.

So that's where we are now in these cases. And, now, we get to the question of what genetic engineers do, and what genetic engineering may do. What a genetic engineer does, of course, is to move and manipulate genes. So, first we have to think about where one finds the gene, and this slide merely points out that the place you find the gene is either on what is called the chromosome, which is a long molecule of DNA, that will come too soon. And, in some organisms, particularly in bacteria, there are also some pieces of DNA which are outside of the chromosome; and these are relatively small pieces of DNA, which replicate, which are reproduced, but not part of the chromosomal system.

Now, what a gene is, and you'll find a gene in those various places, is of course, a unit of heredity as we know from Mr. Mendel and beyond. So that for example, where you don't inherit brown eyes, but you inherit a gene for that trait, for brown eyed trait, and so on.

Physically, a gene is a DNA molecule, and on this slide, I've tried in a very brief way, to do some of the introduction of that. First of all, what genes are made of, are things called the deoxyribonucleotides, and what is used, both among geneticists and we'll use now, are the codes -- if there's still enough water in the world --

So, we just give those short names of A.T.G. and C.-  
And what DNA is deoxyribonucleic acid, which is all of  
those A's, T's, G's, and C's -- the whole string of them,  
a very long string of them put together. Now, they are not  
put together in any random way, because that's an  
information system. And as you see in the line that says,  
"A.T.G - A.T.G." et cetera, what that information system --  
the way that works is to take three letters, it's a three  
letter code, and each three letters codes for a specific  
amino acid. And so, A.T.G. codes for methionine, and so  
on and so forth. And what I've indicated on the slide,  
then, is that that particular part of the gene codes for  
part of a protein which has that particular sequence of  
amino acid, it's methionine, serine, glycine, and so on.

Now, what about a protein, so we need a few words  
about what a protein is. Well, first of all, it's a  
sequence of amino acids. And secondly, it's either a  
structural or a functional component of an organism. For  
example, enzymes like amylases, which help us digest  
starch is a protein. And as a structural type of component  
our hair is made of another protein called keratin. And  
because a gene codes for a sequence of amino acid, a gene



codes for an enzyme or for a structural thing, and that really is the trait that you see. If you don't have a gene for carotene, you don't have any hair. It's very simple. So, that's the relationship then, between the gene, the string of DNA, and the trait that the breeder would normally look for, or the buyer of the product looks for.

Now, in molecular biology, all that is very -- is summarized very modestly in something called the central dogma. And what that says is, DNA, the gene codes by an intermediate compound for approaching, which is the gene product. And that's exactly what we've been discussing, and I've tried to outline here.

But, there's another feature of gene that I have to point out, and that is, that just because a gene is present in the chromosome of an organism, doesn't mean that one sees the product of that gene. A gene can either be on, which means the slang for the fact that the gene is expressed and you see the product of that gene. For example, if you have the gene for hair. If you have the gene for hair and that gene is expressed, you have hair -- if it isn't, you don't have hair. Or, off, or silent, that is, that the gene is not on. So that's another feature of a gene.

Now, the next slide puts some of this together, and brings you a simple gene. A simple gene, and so you see the DNA, of course, as you know, is of the famous double

helix, DNA is really two strands -- but, we'll forget about one of them because it is not pertinent to our discussion. But there is a strand -- one strand will have the information that one wants. What the gene consists of, is that black region -- is the structural gene. That's where all those triplets are that specify a particular amino acid. On the other hand, at the far end here to the left, there is something called the promoter, and there are other kinds of control signals. So, whether or not a gene is off or on, in a particular place, is governed by some of the DNA sequences, which are present in that region.

I should remind you about the off and on business. We have the same genes in every cell in our bodies, and yet this is a thumb, and I have an eye; and obviously, the way that works is that some genes are on -- some particular genes are on in both places, but other genes are on only in the thumb, and others only in the eye. And, so the off/on business is a very important one with respect to how things work.

And then finally, at the right hand edge of that slide, there is some more DNA sequences that stop the expression of that gene. So, all of this is written in DNA-ese.

Okay, so now you know the basic material. I've

reviewed the basic material with which a genetic engineer works, namely, genes.

And what a genetic engineer does, then, is to find the genes, and that's not a trivial operation. I'll tell you, for example, that in us or in corn plants, the nucleus of each cell has perhaps a hundred thousand genes. And, in us, those hundred thousand genes are divided up into 23 different chromosomes. So, the first problem of finding the gene is so formidable, that it's not even worth starting to talk about it here. You just have to believe that it is done, because in fact, it is.

The second problem is, having found where the gene is in this enormous one hundred thousandths of the whole population of genes, you have to cut it out. Now, fortunately, nature has provided a marvelous set of scissors, or perhaps even better, you can think of it as a set of jaws, of teeth, which, when it finds a certain set of those A's, T's, G's and C's, a certain sequence of those, it bites it off at that point. Now, when it bites it off, it leaves a set of teeth marks, which only match the same teeth marks. So, if you bit off one and I bit off another -- a piece of sausage or something -- I guess we could figure out if we looked at them, or at least our dentist might, which of us bit which of them, and they could go back together again.

The main point is, there are special enzymes which can do that.

And then finally, next what the genetic engineer does, is to clone the genes -- and this is a way of making more of that DNA. Now, the way you clone a gene, for example, is to take a plasmid, you remember these are these extra chromosomal pieces of DNA, and this is a bacterial plasmid, and that's that double red circle there on the left. One of the things that a plasmid has is an origin of replication so it can be copied again and again. And, it has what is called a restriction site there, which is a place where it can get bitten by a particular set of teeth. And another feature of bacterial plasmid is -- especially the ones used for cloning -- is that they contain genes, or a gene, which makes the organism that carries this plasmid, resistant to a certain antibiotic.

Now, that antibiotic resistance can occur naturally in fact, that's a kind of public health problem, because one of the other features of plasmids and bacteria, is that these plasmids can go out of one bacterium and into another, and if they carry a gene for resistance to an antibiotic, they can make a whole population of bacteria quickly resistant to exactly the antibiotic your doctor wants you to take for your disease. But in terms of genetic engineering and cloning, that's a useful marker -- well,



what's done, is to take those plasmid that has been prepared from a bacterium, put it with a particular set of teeth, and then take the DNA with the gene in it that you want, and cut that DNA out with that same set of teeth -- mix the things together, and then they can ligate under the right circumstances, and then you can make that thing there on the right, which is a chimeric plasmid -- the piece of bacterial plasmid containing the gene that you want. And, as I said, these pieces of DNA can be taken up by a bacterium. The bacterium will replicate the DNA-- will make more copies of it. And, if the situation and the bacterium is right, it will even express that gene. It will take the information in that gene, and produce the protein for which that gene codes.

And if you've done all that, you have now accomplished the simplest level of genetic engineering. And a level of genetic engineering then, in which a gene is moved from one bacterium to another, by splicing the gene into a vehicle -- that's that vector or that plasmid-- that can reproduce in this new place.

And that's what is involved in the level of genetic engineering that we all are familiar with -- the business of taking a gene for interferon from some animal source, and cloning it, and having bacteria that make interferon. Or, taking a gene for the code protein of a

virus of foot and mouth disease, and cloning that, and getting bacteria to make that protein so it can be used as a vaccine. And this kind of genetic engineering then, is well developed and really under a high level of exploitation at the present time.

So, let me give you an example which is about a half a level above this; and an example which relates to plant-crop agricultural problems. In addition to simply taking the gene out of the bacterium, and then putting it into -- or, taking it out of any organism, and putting it into a vector and having that -- putting that into a new organism, when the gene is taken out, it can be manipulated.

But let me go back one step and tell you the story that I want to deal with as an example here. The example here, is the fact -- and this is an example of something which has been done -- is that there are some plant pathogenic bacteria, that make a living in the following way; they live on the surface of a leaf, and about this time of year in this latitude, or my latitude, when the temperature goes a little bit below zero -- below freezing, not very much below freezing -- these bacteria help the plant die of frost damage. Now the way they do that is that these bacteria have in their wall, a protein, a gene product, which serves as a center, a focus for formation of

ice crystals. And so the ice crystals form there, and it's like a set of swords going through all the leaf cells as this mass of ice grows through it. Then as it thaws a little bit, what happens is that the cell sap runs out, and there is a bacterial feast. These bacteria are really very, very happy. And that's the way they live, but of course, it turns out that if you got rid of the bacteria -- if you got rid of the bacteria and got them off -- that plant can go down another ten degrees -- 9 or 10 degrees in temperature, without suffering frost damage. So, I think you can already see what the advantages would be of being able to control that kind of situation.

Well, it turns out that there are in nature, or, one can find, bacteria of exactly the same type which have a mutation; that is, what has happened in those -- this is an example, it's not the actual case -- if one, a nucleotide, look in the top row, you see that for serine, the code on it is "AGT". If that "A" should be replaced by a "G", instead of having the amino acid, serine, you would have the amino acid, glycine.

Now, you have to remember that there are millions of bacteria per plant, and that there are, maybe, ten thousand -- there may be as many as ten thousand nucleotides in a gene. And there's a frequency, a real change of that kind of change occurring. Well, some of

these mutations -- these are called the point mutations, some mutants of these particular bacteria form a protein, instead of the ice nucleating one -- form a protein that doesn't serve as a focus for ice nucleation. And it's possible to use those to fight off, and replace, the ice nucleating bacteria and to keep the plants from freezing. But, point mutations are not so good, because what you can get going in one direction, you can get going in the other direction. And so, if you really tried to use this as a control system, you may find that you certainly have a lot of mutated bacteria. And so this introduces the way that genetic engineering deals with a problem like that.

So, if one clones a normal gene, and then by using another set of these restriction enzymes, these sets of teeth, you can remove say, for example, the central part of that. Instead of just one nucleotide changing, you can take out a big chunk of that gene so that any protein that formed would have very little resemblance to the one that was there.

And now you take this plasmid -- that's the second one -- with a deletion, and you introduce it into the organism, and what happens is an absolutely remarkable thing. This is diagramed in the slide. So the top line are the two strands of DNA, which is the normal gene in the chromosome -- or, wherever it occurs -- and then, you



have this plasmid with the introduced gene. And the parts which remain of the deleted gene, that match the original one, will exchange. And so, what will happen is, that in the cell, the defective one will be traded for the good one. And by the right kind of selection, you can get rid of the good one completely, and now you have a bacterium that instead of having one nucleotide change, has a big chunk of that missing, and is never going to revert. But the important thing is that what you've changed is only one gene, and that may have no effect at all on how well that thing grows on the leaf. So it can still grow on the leaf just as it did before, but it can't form the ice nucleating thing and it can compete out the ones that are there.

So, that's one kind of approach to the question of -- to the problem of how one might deal with plant pathogens.

Now what you need for genetic engineering is, I think, pretty clear by now, is a gene, a vector -- that is, something like a plasmid into which you can put the DNA -- and a system which will accept that and which will propagate it or permit that kind of gene to be exchanged in the way that I described.

So the question that one has to raise now, is how close is one able now -- is it possible now to do

something like this with crop plants, not just with the bacteria? And the answer is "yes". And the story here deals with an interesting plant disease called crown gall. It doesn't make plants grow horizontally, that's just the way I put the slide in accidentally. This is really growing up and down. It's a stem, and what's been done here is to take a needle and dip it in some special bacterium and poke the plant, and then this plant makes this kind of a cancer. What's happened? Well, what's happened is, that the bacterium contains its chromosomal DNA, of course, but it also contains a large plasmid, called the "TI" for "tumor inducing" plasmid. Plasmid, you remember is an extra piece of DNA that goes on inside the cell. And between the time that that stem was poked with the needle, and the time that you saw it, a part of that DNA, called the "T-DNA" became inserted into the chromosome of the host plant. And the reason that is call big "T-DAN" is because it is transferred DNA. DNA which is transferred somehow, we don't know quite how, from the bacterium into the plant. And then that gall forms. The gall forms. So, what does that T-DNA have? That transferred DNA? First of all, it has at its ends, at the end of the DNA sequence, pieces which help it go in. And its useful to note now, that the Nobel prize which Barbara McLintock, who works on corn, got a few weeks

ago, was for her discovery or her realization far long before anyone else did, that pieces of DNA could move around inside a chromosome. And it's exactly because they have these special ends which help them move around. Well, the T-DNA have these insertion sequence at its ends which helps it get in. And it has genes for causing cancer, for causing tumors, probably because the products of those genes alter the hormone balance in the cell.

And finally, one can make or find sites in that DNA to introduce foreign genes. And what several groups of research workers have done, is to engineer the T-DNA, to retain, keep the insertion properties there; to remove the genes which cause cancer, and to keep in the site for introducing foreign genes. And those, and these kinds of engineered T-DNA, has been used to transform plants. And the way you do that is this; you put the desired gene or genes into the engineered T-DNA, and then you put that new kind of T-DNA into agrobacterium, and it exchanges for the stuff that was there before, in the sort of way that I described before. And, now, you can take these new, these agrobacterium carrying the gene that you want, and grow them with plant cells -- tobacco plants work very well. And then you can kill the bacteria and find among the cells, some that have that new gene that you want. And then by another kind of marvelous biotechnology,

by shifting hormone levels and so on, it's possible to regenerate a whole plant from each transformed cell. And this kind of thing has been done now with a gene which inactivates a certain antibiotic. Now the plants are normally killed by this antibiotic, but plants which have been treated in this way, have in their genes now, a gene for inactivating that antibiotic, and to the extent that that antibiotic is parallel to a herbicide -- although it would be terribly, terribly, terribly expensive -- one has essentially the equivalent of transforming a plant to that kind of resistance.

Well, there are three levels of genetic engineering and what we've talked about is essentially one level. As I've already said, the simplest level of introducing the gene into an organism where it is expressed all the time. Remember, we have the off/on thing.

Now, the next level of genetic engineering, and this is one that we're not very close to at the moment -- well, we're not very far away perhaps, but we don't know how to do it now -- is to introduce a gene with control elements so that it is expressed in some tissue but not others. For example, if you want a new seed storage protein in a plant, you don't want that protein in the leaves necessarily, you want it in the seeds. And so, you have to be able to control that. And a current high



level of activity in this kind of molecular developmental biology, is trying to understand how it is written in DNA and how certain genes are turned on, or expressed in some places and not in others. So, we don't have the information for that now.

And the third level, is that many of the agronomically important traits are not the result of a single gene, but of several genes acting together. That's determined by mapping things, by conventional genetics, but we don't really understand how to begin to deal with this problem, because in many of these cases we don't know what the immediate product of the gene is, and therefore, it is hard to find them. So this is the third level of genetic engineering, and a level at which there isn't very much work underway at the present time, and a lot has to be done.

Now, what's the present limitation of genetic engineering? Well, the present limitation is that we don't know enough. We don't have enough information. The knowledge is limited and we have to know more. This brings up an important point, and that is that genetic engineering is fundamentally knowledge based, more than it is empirical. And that's one of the strong differences from the breeding selection systems. You know, there was breeding and selection going on long before anyone even

knew what a gene was. One still doesn't understand a lot of the mechanisms of genetics, in terms of gene exchange and so on. But one could do breeding. On the other hand, for genetic engineering, you have to have the knowledge first. It's its strength because then you can do things rationally, but it's also its weakness because it requires a lot of investment of money and of people, to understand the basis of how it works. But, you know, we all believe that rationality pays, and so one is convinced that this is the way to go at it.

Now let me look for a few minutes as we continue, back to the current technological intervention system with crop breeding. You recall that we started out by saying that one of the problems is that it takes a long time. Well, it's possible that with some of the genetic engineering techniques, one can introduce genes more rapidly than one could by conventional breeding. In the case that I described of the resistance to the antibiotic kanamycin, transformed into tobacco cells, and tobacco plants, there appeared to be no other changes in the plants, except that they had this new gene working for them. But it is quite possible that when some genes are introduced, that it may change exactly the properties that one wants, and, therefore, it is entirely possible that for some of those things, one would still have to go

through a breeding cycle, but that will have to be determined on a case-by-case basis. So the odds are that some genes can be introduced with a much shortened time for introduction, much less than the six or seven years, but that there may be other cases in which it will be necessary to go through the breeding.

But what's even more remarkable, I think, is not -- although the quantitative thing is important -- what's more remarkable is the qualitative one, because even if breeding is required, what you can do with genetic engineering is what's now impossible, or what has been impossible. It's possible to take a gene from a bacterium. Bacteria aren't part of the breeding population of a corn plant. Take a gene from a bacterium and introduce it into a plant, say a gene for a toxin or for a herbicide degrading enzyme. One can take a gene from a plant which you can't cross with the one that you want to introduce the gene into, and put that in. For example, genes for resistance to some diseases; or the kinds of tolerances Dr. Lee was talking about with respect to the natural environment. Or, one can take a modified form of a naturally occurring gene, or a gene from an animal cell, and so on and so forth, and all of these things -- it's not that it takes a long time to do them, without these techniques you can't do them at all. And so the pool from which one can import useful

genes is enormously expanded with this technology.

Now, another aspect of this, is if we look at the biological components of a crop system, you see already that we have begun to do things and look at problems in a different way. One of the first examples I gave you, dealt with the possibility of altering plant pathogenic bacteria so they could fight off their own kind. And so now one begins to think not only of genetically affecting the crop plants, but also in genetic ways, of dealing with some of the pathogens which are around. And it seems not unlikely, that perhaps the gretest changes in the approaches may be in the agricultural chemical sector.

New ways of dealing with problems that are now dealt with by agricultural chemicals, and that of course, brings us to the kind of issue that Dr. Lee was also raising, namely, the conservation of resources. And one has then a greater possibility of this kind of conservation by taking entirely new approaches to the problems of improving and increasing productivity. I should add that there are other pertinent technologies that I have not dealt with at all which also have the possibility of helping us in these connections.

So where are we now? On the positive side, we're at the -- the people in this business -- are at the testing state for some changed bacteria. There is a problem with



the ice nucleating bacterium as you read in the papers, and that is why I picked the example, because you have probably read about the questions of regulations there. There also seem to be work on improving by these means, bacteria which interact with plants for nitrogen fixation. At the whole plant level, as I described it, genes can be introduced, and we don't know about the control, but one has ideas about the kinds of genes that can be introduced.

And to review then, the limitations of the genetic engineering as we have it now, as I mentioned already, we don't know about organ specific gene expression. We don't know how to deal with the multigenic trait businesses, We don't know, specifically, we can't make any general predictions about how an introduction of a gene will affect plant development and metabolism. We don't have any system for transforming cereals. The agrobacterium system works in many, if not all, dicotyledonous plants, but not in cereals. And then there is a fifth problem which is even too difficult to deal with.

So, to surmount the limitations, and we can understand what some of them are, we have to remember that what is needed as basic knowledge -- and that one of the characteristics of genetic engineering and some of the other biotechnologies, is that you have to pay up for the basic research right up front, that one needs a bigger

research investment and more workers, and I suppose one has to think about -- not a combined effort, but really an intertwined effort between molecular biologist and the field people.

And what will things be by the year 2000? I guess all I can say is, different.

Edward A. Grefe, Chairman  
International Civics, Inc.

Transcription of remarks made November 3, 1983  
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When I'm invited to talk about the information explosion, and computers and things of that nature, I tend to see peoples eyes kind of fog over, and I can appreciate that. It's a little like the boy who didn't want to go to school and his mother kept saying, you know, "You got to get up and go to school." He says, "I don't want to go to school." She says, "You got to go to school." He says, "I just do not wish to go to school today." She said, "Look, you give me any reason why you shouldn't go to school, any number that you like, and I'll give you one that you should." And he said, "Well, all right. If you must know, mom, I'm a little tired of the kids calling me names -- tripping me as I walk down the hall and knocking me into the lockers, sticking gum in my hair, bugs in my desk, and generally making life miserable for me. Now, why do you think I should go?" She said, "Because you're 47 and you're the principal."

What we're talking about when we talk about the information explosion, what to look for, perhaps even, what to prepare for, it is a little bit like that person

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who says, "I really don't want to deal with this, today." Because all of us in a certain sense are 47, and we are in a sense, the principal of our own destiny, and what we have to be able to deal with is this information explosion. That's what our topic is today -- where we are, where we're going, maybe a little bit about how to prepare for it.

I think the person who follows me on the panel, is going to do a lot more about talking about the future, because that really is what the Naisbitt Group's great strength is, is to have certain indicators of where we are heading. So, I thought I'd kind of set the stage, and say, you know, how do we get to where we are.

We are living in a unique time and I suppose if I had been a speaker here a hundred years ago, I'd have said the same thing. There is one difference though; and that is, I can demonstrate, I think, the uniqueness of this time in the entire history of mankind.

There is alive in our nation today, people in their 70's, 80's and 90's, who as children grew up, not believing that you could fly. You know, if man was meant to fly, he'd have wings. As children they grew up essentially in an agrarian society. At the turn of the century most of our people were involved in some way or another, with an economy that had to do with an agrarian based society. They grew up essentially in extended family relationships. People lived in Jonesboro because all the Joneses lived there. There were cousins, aunts, uncles, sisters, brothers,



what-have-you. And they mutually supported one another in their ability to cope with and deal with life. And they were, ladies and gentlemen, the very last generation that we know of, in the history of mankind, in which the child necessarily received from the parent, the means of survival. The child learned how to shoe a horse, how to plow a field, how to bring in the crop, how to make clothes, How to do everything that was essential for physical -- physical survival. And so when the child necessarily looked to the parent to say, "How do I live my life?" The parent, in effect, gave that child the moral code, the sense of justice. The sense of however they were to live their life. We have a broad middle generation, people who are roughly between the ages of 40 and mid-70's, who as children, grew up not believing that man could go to the moon. That was science fiction. That was Buck Rogers. That was all that Dick Tracy stuff, you know, talking and coming in on your special wrist radio. As children grew up in essentially, an industrial society, major shift -- major, major shifts totally oriented toward industrial, as children grew up in a nuclear based society. By this time sisters lived in Cleveland and brothers lived in New York City. And by this time a certain shift in how one got to deal with survival, because that was a survival age with depression, wars, et cetera. Whereas, in an earlier generation it was land based, and there was a very clear identity in terms of survival, you know, "What does Daddy do?" Well, Daddy is a farmer and he plants the

field, and he's out there doing it, and you can go out there and stand behind him and help him do it, and you can learn by watching, and doing, and feeling. In the industrial society, "What does Daddy do?" Well, this is a wedget and he makes a thousand per hour, and you can go down to the factory and watch those wedgets being made, and there's a very close relationship there of what a person does with a sense of oneself. A very objective kind of way of looking at life. But also in this split up of the family, from the extended to nuclear, we took on, in terms of expertise, someone other than -- or, began the process of asking someone other than the parent, the questions -- the basic question of "How do I live my life?" If you didn't know, you might ask your minister. If he didn't know, you might ask Ann Landers. If you want to know how to set the table, ask Amy Vanderbilt or whichever Vanderbilt was telling us at that time. Now, it's "What kind of jeans do I wear, with Gloria, but at that time there was the expert. There was always the expert out there.

And what do we have now? We have a generation growing up in which, first of all, there is a sense that anything is possible. I mean if you can send a man to the moon, you can rebuild New York. Maybe we ought to just send the man to the moon and leave New York alone, but that's not the point. The point is that you can do anything in a certain sense.

Growing up in sequential family relationships.

Divorce and remarriage is so prevalent in our society today, that most people have a number of fathers, step-fathers, et cetera.

And growing up in a service or information based society, which is distinguished in a number of ways, not the least of which, it is not an objective society. I mean it is not objectivifiable in terms of what one does on a day to day basis. I don't know how many times you go to a party and ask meet somebody new and ask "What do you do?" And, they begin by telling you their title, and then they say, "Well, let me explain what it is I do not do." You see, because there are always these conditional kinds of things. I have a case in mind of a police officer, who was made a community relations officer. And his child who was about eight or nine, was really quite disturbed by this. I mean he could understand daddy in a uniform and a holster and the concept of arresting, and taking care of law and order. But suddenly daddy had a suit on, and he went to an office. So, his mother says, "Why don't you go down and watch what he does?" Well, all he did was sit at a desk and talk on the telephone all day. It is a very subjective kind of society. Very difficult to explain to people on a day to day basis what one does.

I say I am a political consultant, and the easiest way to explain that is, people come into me and say, "Well,

I want to run for office." I had a man come in the other day and say, "Well, I have half a mind to run for office." I said, that's about all it takes.

I just want to make sure you are all awake and with us here.

What I'm suggesting is that we have alive, and well, and breathing today, at least three distinct generations of people, among whom there are some basic communications problems. The basis for their way of judging what goes in a society, shifts from generation to generation.

When I graduated from high school -- I was born and raised here in Washington -- when I graduated from high school in 1955, the really sharp students who did not choose to go on to college, saw as a career -- and a very exciting career if they got it -- the opportunity to go to work for the IRS, or the CIA. Growing up in this town, you knew when someone said, "I can't tell you who I work for." Oh, you work for the CIA. You know, it was one of those in-things we all knew. But, what I'm getting down to is that shifted over time, because another distinguishing characteristic of this under-forty generation, is that they've questioned all institutional authority. Some say it was the Vietnam conflict, some say there are other things. There was the black revolution, the women's revolution -- there were a number of revolutions that went



on in our society, but the fundamental thing that came out of that is the questioning of authority. The questioning of structure in society. Tofler and others talk about it in terms of a number of interesting scientific things going on zoography, jet travel -- I mean the fact that you can have breakfast in Paris and have another breakfast in New York. The speed with which you can move around the world. The speed with which you can get information, is what brought about what we're talking about in terms of the information explosion.

Certainly television, a major pervasive influence on our lives. I have a friend who tells me this is a true story. An eastern U.S. senator who went out to a farm state, so he says, and stopped in at a local market there to pick up something. And the fellow who ran the market said, "Say, I know you. I've seen you on television. You're one of those politicians back in Washington, right?" and he says, "Well, yes, as a matter of fact I am." You know, preening himself a bit. He says, "A lot of really smart people back there in Washington, aren't there?" My friend allowed as how there are a lot of smart people here in Washington. He said, "I bet there are a lot of dumb people in Washington, too, aren't there?" He said, "Yes, I got to admit there are a lot of dumb ones too." And the fellow looked at me and said, "I guess at times it

is kind of hard to tell the difference, huh?" At any rate, that's part of the pervasiveness of television. We all seem to know a lot of what's going on. I happen to think the other day that it wasn't that the Pentagon wanted to prevent the press from covering the invasion into Grenada, I think it was the difference of not wanting television there. Now, when you cover a war in print, it's very easy for someone to change an adjective or eliminate an adverb or change the subject or it's easy to change the words in print, but that television is so pervasive. And then we have -- what we want to move into is the concept of computers and the impact on our life.

When we're talking about computers, that's where we're really talking about the information explosion because what the computer does is bring to us instantaneously an enormous wealth of information. And I say "information" because when we're talking about it, and I hope we keep clear among ourselves, we're talking about the information explosion -- we're not talking about the intelligence explosion. There is a major distinction. Computers are, after all, nothing more than electronic filing cabinets. They can provide enormous data; and they do. But that, in fact, is what is scary to us. And what I think we are talking about when we talk about the information explosion, and moving toward the year 2000, and the communication

problems that exist at the moment, is a fear of having to deal with even more information. I mean, I marvel at listening to someone talk about genetic engineering. And Yet, I don't know how many people in the audience, or how many people nationwide, say, "Should we really be fooling around with those things?" And what does it all mean? Again, I say when I grew up, I thought I knew what murder meant, I mean that seemed to me to be a pretty clear concept. But when, as happened in Illinois, not too long ago, someone takes a revolver and shoots someone else, and the person who is shot is taken to the hospital, and the life support system says this person is dead, and the brain machine says there is life, but the doctor believes the life support system, so they take the heart out and ship it out to Oregon where somebody is waiting for a heart transplant. And when the District Attorney starts to bring charges against the individual who had pulled the trigger, the Defense Attorney say, "No, no, my man didn't kill him, the surgeon killed him." You see. When you are watching television, you watch about a Karen Ann Quinlan, you see, all of us grew up in ages where life and death were fairly simplistic or simple concepts. There was a sense of black and white.

What the information age has done, and particularly through computers is cause a lot of gray to be thrust upon

us in which we have to make decisions we never had to think about before, enormous decisions with tremendous political consequences. If you live in major cities, as do I, the number one priority in the few years ahead will be what we talk about as infrastructure. You know when I go to LaGuardia airport, I am not quite certain if that bridge that I go across is going to fall into the East River. And when I turn on a tap of water, and I know that the water reservoirs and the pipes are over a hundred years of age, I'm not quite sure what's going to come out. And the infrastructure of our society has to be taken care of. Secondly, if we're talking about gray areas and the kinds of difficulties that we've never had to deal with previously. We're talking about a major political problem which no one really wants to give anything but lip service to, and that is the whole question of immigration. It's something that is going to pull this country apart. It already has to a certain extent. We will have, as Mr. Naisbitt has pointed out, and others, very shortly -- say the state of Texas, a situation not unlike Quebec, two people, two languages. And how that group will be assimilated into the United States is a major problem for us to be dealing with. If we're talking about the kinds of things we're going to be dealing with, water is a problem, a major problem. But certainly beyond that, we



have a population that is aging, and who is going to pay for all these things -- Social Security being one of them. So, we are getting back to computers and the amount of information, and the fact that we can use them, how do we use them, and we say well, people are a little bit afraid of this information age, and I would suggest to you they are also afraid of computers. One of the interesting problems we have when we deal with computers with our clients is getting them over that hurdle, the real fear you know, to many men it's, machismo, I don't want a keyboard around me. That's secretaries work. And to the liberated woman, who is now an executive, the same thought, I once had a secretarial job, I'm not going back to that. That's why computer manufacturers are trying to come up with computers that don't have keyboards, to try to get over that concept that perhaps it is something to be looked down upon. But I would suggest to you, we have to learn computers, in fact, Mr. Naisbitt again, not to steal your thunder, talks about the two languages you have to learn, one being Spanish because of that population -- an enormous population, with enormous political consequences for all of us. You also have to learn computers, whether you want to or not. But let us assume for example, that you are 35 years of age, physically, 35 years of age, and if you are, it means that you will retire, theoretically

retire from active business career in the year 2013. Very few people think about the year 2000. Why? Because none of us have ever had to think about it. In our day to day lives, we write 19. We write checks, if you are able to write them in this day and age. Or, we sign letters, but we always use the word "19". The year 2000 is kind of mythical. It's kind of magical. There are those of us alive and well today who are in active producing careers who will retire from that career the year 2013. If we think we can survive between now and then without understanding computers and how to operate with them, and how to process this enormous amount of information, in order to make intelligent decisions, we're making a major mistake. I mean, I know there are people who are fighting against this. There is a major, major political movement in the United States today -- the fundamental movement -- and I'm not trying to suggest anything other than it's there, and that many people impart that we've got to return to a fundamental sense -- right and wrong, et cetera. A very real feeling because of this sense, you know, too much is going on. They of course, have as a contrast, the Unitarians. Those who don't know, I'm told that the Unitarians are those people who believe that when Moses came down from the mountain he brought with him the ten suggestions. But, there is a very strong

real movement in America today, on that basis -- the fear of -- you know, the change is too rapid, and yet, you can't roll back the clock. So, I'm suggesting that person who is 35, first of all, in order to survive has to learn computers. Secondly, he or she may have hired somebody today, just out of college or just out of school who is used to working with computers. They've got to be put into operation. And, if you walk into a company today, or perhaps onto a modern farm today, without computers, the first question is, "Why don't we have computers? I mean we had them in school, why don't we have them here?" See. And you're talking about the communication gap, how do you deal with your children, quite apart from playing games -- quite apart from playing games.

When I was in the fourth grade, I remember distinctly because I went to a school where it was the only non-nun and so I couldn't forget this -- but also, prior to Ash Wednesday, we had Shrove Tuesday, and if I could stand, or if all of our classmates could stand and in a loud clear voice recite the multiplication tables, we would be rewarded with cocoa and doughnuts. A wonderful experience, obviously, it stayed with me all these years.

Well, today, by the second grade, children have learned binary equations. I mean, I don't know of anybody that does the multiplication tables any more. But, what

I'm saying is the whole shift of the education. If one is saying, "Well, how do I deal with my children?" I'm saying if one is dealing with ones sense of how one is going to deal toward the year 2000, one learns computers. If one is going to deal with ones colleagues, one has to learn computers. And, I'm saying if one wants to deal with those 4, 5 and 6 year old children, one must learn computers, and not, as I say, just to play games.

It would be nice to return to a simpler time, the time of just black and white, but that is not what the future is going to be. It would be nice simply to say, we will sit and listen to either the politician tell us what the Monroe Doctrine is, or the TV commentator tell us what the Monroe Doctrine is, or we will simply, because today it's possible of doing this -- we will take our little radio shack, whatever, and dial up an information source and say, let's see what the Monroe Doctrine actually said. Because what will happen is, certainly those who are in school will say that. They no longer will be relegated simply by the textbook that is available in that school, or the library that is available in that school.

We have available today relational data bases, which then will say under Monroe Doctrine, see also other doctrines; see also, if you are this broad-minded, see



also the Brezhnev Doctrines, since that is what the TV commentators say we are confusing.

What the computer can reach out and do is far more information. And what the computer is forcing upon people, therefore, and what the information explosion is forcing upon people, is making intelligent choices.

What does all this mean then? Certainly, if I am in a business, I imagine, such as farming. Not having been a farmer I can't speak with a great deal of authority, but my understanding is that the way it can be used -- certainly for record keeping. Certainly there is information available on market conditions, on futures, crop and livestock prices. I was reading the other day that there is a new system available today that lets you look at how many acres to plant of each crop, whether it's corn, or soy bean mix, what the proper relationship and ratio should be, and how you are going to earn more bucks if you do something some way, versus how much it is going to cost you doing something the other way. All of those are very practical considerations and to every business person they are the same kind of practical considerations, that the information explosion is forcing upon you and the computer is allowing to manipulate even more data to deal with it. In your sense, or in the sense of the farm economy, John Basket who is the publisher of a publication

called "Agricomp" I believe, said that micro computers are such a part of farming today they have become as important a revolution in farming as the tractor itself. Dr. Robert Cramer at the Kellogg Foundation has said that by 1990's, 75% of all commercial farms will be operating essentially using a computer based information and that 90% of all the county extension offices will be so equipped.

So from a very practical consideration, computers are with us, and the information explosion is with us, and we'll have to deal with it.

I'd like to say on a personal level, though, it is something that we will have to deal with, and if we deal with it properly, I think it will make us all better citizens, because we will not simply need the commentator to tell us what happened two, three, a hundred years ago. That's information we can call up on our own. That's information we can discuss in the family. Once we get tired of the video Star Trek games, maybe we'll start dialing up data bases and saying, you know, what has happened on this particular question? What is the research on this? What is the historical view on this? Which I think is going to make it, in a sense, from a civic standpoint, a critical part of our decision making path. And I happen to think that is a very good kind of

thing to think about. But I don't think computers are something to be afraid of, even if you were, you have to deal with them. Just as you would say, well, I'm a little afraid of the growing Hispanic group -- that's a little too late because it is here and it's growing, and it's going to get bigger and we will have to deal with Spanish speaking people, who may choose not to be assimilated in the same way that other groups were.

But I think beyond that, simply having to do something, beyond simply having the practical uses that it can have in each of our daily lives, I'd like to believe and close with this thought, that it is something that can be personally very rewarding. It is something that is going to give us the kind of information to help us make perhaps the kind of decisions that will lead to a much better life for everyone in the year 2000.

Thank you.

Corrinne Kuypers-Denlinger  
Director of Research, The Naisbitt Group

Annual Agricultural Outlook Conference - Session 35



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Good Afternoon...My task here today is to share with you The Naisbitt Group's vision of the world, and, while that sounds a little presumptuous, it is less presumptuous than telling you about your business...as I'm sure each and every one of you know more about your business than I do. It is also more useful because I don't think anyone should think about the future of their business just in terms of the future of their business. We have to think about what's ahead in the broader context of social change and how it will affect not just ourselves but everyone else...and the context is changing dramatically... First and foremost...and I'm sure this comes as a surprise to no one...this country is undergoing a profound, unalterable change. We are shifting economies...restructuring for an era that will be dramatically different from the industrial society we are leaving behind. Only once before did America experience so profound a shift, and I dare say none of us were around to experience it. One hundred and fifty years ago, we shifted from an agricultural to an industrial society. Now, as then, the changes in store are dramatic, exciting and filled with limitless opportunity. Ten of the characteristics of the emerging information society are thoroughly discussed in John Naisbitt's best selling Megatrends: Ten New Directions Transforming Our Lives...which I'm sure many of you have read and are breathlessly awaiting its sequel. I am equally sure that many questions come to mind. For instance, how do we know what those characteristics will be? How can we be so sure we are right, and more importantly, what does that mean to me, my business, my institution?

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Let me start then by telling you a little bit about who we are and what we do. For twelve years now The Naisbitt Group has been monitoring events, activities and issues at the local level via daily newspapers...two hundred of them a day. The methodology we use is called content analysis and, while The Naisbitt Group was the first, and is currently the only firm, to use this methodology commercially it is not our own. During World War II the intelligence community was looking for a way to find out what was going on inside Germany. Information about food shortages, transportation difficulties and casualties were not available to them, but local newspapers were. With the help of Paul Lazarsfeld and Harold Laswell -- now well known communication theorists -- content analysis was designed. By reading news stories about lines at meat markets, about train arrivals, departures and delays, and about local men who had lost their lives in the war they were able to learn about conditions inside Germany. The method was so successful that content analysis became the methodology of choice in learning about countries where information was difficult to come by. In fact, the U.S. continues to spend millions of dollars doing content analysis of local newspapers from a variety of countries.

Why are we so confident the method works? Well, for one thing we've proven it to ourselves over and over again. But also, for economic reasons the news hole in a newspaper is a closed system. So, when something new is introduced something else, or a combination of things is forced out. By keeping track of what is introduced and what is forced out we learn a great deal about what people care about and what they are doing about those concerns.

One of the most important things we have learned is that what people do is more important than what people say. It is easy to talk about a problem, it is not always easy to do something about it. When an action is taken...that's when issues take shape. We monitor what people do.

The second most important thing we have learned over the years is that despite the conceits of places like New York City and Washington, D.C. no social invention occurs in large, centralized cities, but rather social innovation -- real, significant change -- occurs in small cities like Tampa, Hartford, Denver, San Diego, Cincinnati -- well, maybe not Cincinnati. Mark Twain once said, "If I were to learn that the world was going to end tomorrow, I'd move to Cincinnati...it will take at least another twenty years to happen there. Change occurs at the grass roots level, bubbles up and spreads until it becomes a shared accepted concept.

As I mentioned just a moment ago we have identified ten elements of the emerging information society (there are considerably more than ten, but these ten for all intents and purposes explain the new society). Let me just list those ten first and then go back and discuss six or seven of them in terms of the impact they have had, or will have, on how we conduct our business in the future.

They are:

1. From an industrial to an information society.
2. From forced technology to high tech/high touch.
3. From a national economy to world and regional economies.
4. From short term perspectives to long term planning.

5. From institutional help to self help.
6. From hierarchies to networking.
7. America's population centers are shifting from the north to the south and southwest.
8. From representative democracy to participatory democracy.
9. From centralized society to a decentralized society.
10. And, from either/or to multiple option, Baskin Robbins society where everything comes in 31 flavors.

Let's start with the shift from an industrial economy to an information society. Because it is the most fundamental, because it isn't just coming, it is here and because it has the most profound implications for everyone of us in this room.

The employment history of the United States can be summed up in three words. Farmer...Laborer...Clerk.

In an agricultural society, most workers were farmers; the primary resources were land and natural energy. The time frame was the past...we learned from last year how to plant a better crop this year.

In an industrial society, most workers were laborers; the primary resources were capital and raw materials. The time frame was the present...get it done...get it out...we thought about quarterly profits and annual revenues.

In the emerging information society the primary resource is information/ knowledge. Most of us are essentially clerks...we process information...the time frame is the future. We must

learn from the future in precisely the same way we used to learn from the past./ The splendid thing about information is that not only is it renewable, it is self-generating. Furthermore, anyone with a typewriter...o.k., maybe a word processor with computer capabilities...and a telephone can start a business when what you know is more important than your capital outlay or access to raw materials. That we are an information society is evidenced by a few simple statistics. In 1957, only about 17 percent of us worked in jobs where processing information was the job. Now, more than 60 percent of us work in occupations where gathering, processing and disseminating information is the job. Most of us today spend our occupational time in information intensive employment...in banks, stock markets, publishing, insurance, retailing, education, lawyering, government and yes, research and consulting.

David Birch of M.I.T. tells us that during the 1970s 20 million new jobs were created in this country. Never before had so many new jobs been created (by comparison, in Europe only 2 million new jobs were created during the same period.) Only 5 percent of those 20 million jobs were in manufacturing, and only 11 percent including the 5% were in any kind of goods-producing industry. Almost 90 percent were in the information-knowledge-service sector. Furthermore, 80 percent of those new jobs were created by companies four years old or younger. Which gives us a profile of the emerging economy...very young organizations involved in some way with processing information. (It's interesting to note that since 1967, total employment in large corporations has declined every single year.)



The time between economy shifts is a time of tremendous entrepreneurial activity. It is a time when access to the economic system is easier. When we shifted from an agricultural to an industrial society literally thousands of new companies were formed. Many of them did not survive, but many of them did. The same is true today; only a far greater number of companies are being formed. At the crest of the stable industrial period (1950) we were creating new companies in this country at the rate of 93,000 a year. Today, we are creating new companies at the rate of more than 600,000 a year. It is important to note that women are very much a part of the entrepreneurial explosion. About a third of the companies now emerging, are being started by women. Consequently, the social arrangements and instrumentalities that were created by and were consonant with the industrial society are now out of tune with the times.

Computers and virtually instantaneous communications capabilities is what drives the information society. [The launching of Sputnik -- that glorious achievement of the industrial age -- and the now almost routine space shuttle flights -- trumpeted as the first steps toward conquering that "final frontier" -- actually had more to do with launching the information society than they did with space exploration...at least in our lifetime. It's the satellites that are up there allowing us to talk to each other anywhere, at any time that are changing our lives by helping to create an information society, not by propelling us into space.]

As computers become more "user friendly" -- and less expensive -- boundary lines are being erased, politically and economically, and

in every other way, within the United States and outside its borders. They are liberating all of us from the confines of the industrial paradigm.

Computers in the workplace are erasing the boundary lines between management and staff...the same skills are, or soon will be, demanded of all, and all will have access to the same information. Consequently, we are all going to have to rethink what we do and how we do it.

The same is true on a much broader scale, in terms of international economic development. Computers and instantaneous communications are erasing boundary lines between countries -- political boundaries as well as physical ones. Consequently, the developed countries and third world countries alike have had to rethink their role in the larger community that has come to be known as the Global Village.

In this country, as elsewhere, the concept of national economy no longer applies. It has become an oxymoron. Do you all know what an oxymoron is? It is a phrase containing two incompatible ideas. National Economy...there is no such thing. It's like "airline food", "military intelligence", "jumbo shrimp" or more recently "federal assistance"...and then there is always my personal favorite, "postal service". What is replacing the concept of national economy are world and regional economies.

The world is deeply involved in the process of redistributing labor and production. As part of that process the United States and other developed countries are deindustrializing. We are on

the way to losing the following industries: steel, automobile, railroad equipment, machinery, apparel, shoe, textile, and appliances. Those products can be, and are being, made more efficiently, and less expensively in Third World countries. In fact, by the end of the century...which is not that far off...the Third World will make as much as 30 percent of the world's manufactured goods. The rest of us will have to look to the new technological adventures: electronics, bio-technology, alternative energy development, financial services, leisure travel, mining the seabeds, and a host of other activities, some of which haven't even been thought of yet.

That we are losing our industrial base is not a sign of national decline...it is a sign of the times...evidence that the United States is leaving the industrial tasks to those more suited to perform them -- for whatever combination of reasons -- and assuming their role as information managers. A role that can only be filled by a country with the sophisticated skills that those tasks demand.

We are not alone, Japan, for instance, is getting out of the steel business and the shipbuilding business. She knows that in these markets (which are at saturation worldwide) South Korea will outdo her in steel, and ships will be more economically built by the new shipbuilders: Brazil and Spain.

The point here is that from now on, the important decisions that are going to be made politically, economically, and every other way are going to be made from a regional and global perspective. No longer are we going to think of ourselves as

simply a part of the whole that makes up this world leader known as the United States, but rather, we are going to begin thinking of ourselves and behaving as members of a much larger community, a global community, and each one of the states will think of themselves first as an independent member of that community, second as part of a region and only lastly as one of the fifty states.

Our research shows us that this is already the case. In California, in Florida, in Colorado...in virtually every state and region economic development initiatives focus on how this state and this region can survive and profit in the global marketplace. This shift is also going to change our measure of success...and our measure of productivity.

The shift won't be easy and developing new standards of measurement will be even more difficult...we have a hard enough time measuring the production of goods and services, imagine how difficult it will be to measure the production of information and knowledge products.

Another major shift that we have been monitoring over the past ten years or so is the shift from a centralized society to a decentralized society. The industrial era demanded a certain degree of centralization both to take advantage of the economies of scale and to serve a mass market. The products of an industrial economy required a centralized effort in terms of capital, labor, material and physical plant. Businesses were somewhat limited in site selection because manufacturing demanded cost-effective, efficient and accessible shipping routes. This is not true of information businesses. Consequently, people can work where they choose to



live not vice versa, and are doing just that.

I'm sure it is not news to any of you that America's population centers are shifting from the north to the south, so I won't dwell on it, but only mention that the shift is actually from the north to the west, southwest and Florida...and it is irreversible in our lifetime.

Now, back to decentralization...

Americans have been pulling power and authority closer and closer to home, back to the local level. People are demanding to participate in the decisions that effect their lives and are winning that right. It has become extremely important that we pay attention to what is happening in our own backyards...in our own state, our own county, our own city...because the decisions that are being made there are the ones that will most directly affect our lives. This massive decentralizing effort, by the way, has very little to do with the Reagan administration's new federalism program...Ronald Reagan is merely riding the horse in the direction it was already going.

Consider this. In the last Congress, more than 20,000 bills were introduced and only about 600 were passed (mercifully). In the current Congress, there will be about 15,000 bills introduced, and about 500 will become law. But in the state legislatures there will be collectively more than 250,000 bills introduced and more than 50,000 of them will become law.

Decentralization is not just a political phenomenon, it's something that's affecting every institution and every profession in the country. Top-down hierarchical organizations that purport to represent people or institutions or anything from a very abstract top-down stance are either decentralizing or disappearing. They are disappearing because people don't want that anymore. They have decided for better or worse that that's not in their best interest. One of the reasons that labor unions had been declining constantly over the last ten or fifteen years is because the people they used to represent in that old industrial paradigm are also decentralizing power and authority, and they are now decentralizing it all the way down to the individual. People don't need or want somebody to represent them as a large, impersonal group. They would rather take care of things themselves in their own setting within their particular situation.

It's also true with things like the Consumer Movement. Where is Ralph Nader now? Ralph Nader is 18,000 small, very strong consumer groups that are forming around particular issues. City by city, county by county, not top-down.

An example of a large umbrella organization that is getting weaker and weaker is the American Medical Association...in 1970 half of the doctors were members, in 1980 only a third of the doctors were members...mean-while, medical specialists organizations -- [urologists, pediatricians, thoracic surgeons as well as the county medical organizations] are getting stronger.

The same analog illustrates what is happening with leadership in America. It too is decentralizing. We have no more great captains of industry, no great leaders in the arts, in academia, in civil rights, in labor or in politics. That's because we followers are not creating those kind of leaders anymore. Followers create leaders, not the other way around. What is happening is we are creating leaders of much smaller constituencies. Towards a much more self-directed purpose.

Occurring almost in lock-step with the shift from a centralized to a decentralized society was the abandonment of the traditional representative democracy in favor of a participatory democracy. The representative democracy was designed 200 years ago when it was the practical way to organize a democracy. Direct citizen participation was not feasible, so we elected people to go off to the state capitals...and the national congress...represent us, vote and then come back and tell us what happened. Today, with instantaneously shared information we know as much about what is going on as our representatives do. An educated electorate is far less willing to let others make decisions for them. While we still elect people to represent us, now we make it abundantly clear that if they plan to act in our best interests then they better make an effort to learn from us what our best interests are. Today we also learn just as quickly if our representatives are not acting in our behalf and we are just as quick to let them know, at the ballot box, that we can find others who will.

We are no longer an either/or, chocolate or vanilla society, we have become a multiple-option, Baskin Robbins world where everything comes in 31 flavors. It used to be either we got married or we didn't; either we worked 9 to 5 (or its equivalent) or we didn't; we drove a ford or a chevy; chocolate or vanilla.

Remember when bathtubs were white (actually I don't remember, but some of you probably do) telephones were black and checks green? No longer. There are 753 different models of automobiles to choose from and that's not counting the choice of colors they come in, or an entire menu of add ons. In Manhattan, there is a store called Just Bulbs, which stocks 2,500 types of light bulbs -- and nothing else.

The either/or choices in the basic areas of family and work have exploded into a multitude of highly individual arrangements and lifestyles. As I said it used to be that you got married or you didn't...and while marriage with all the trimmings is making a comeback there are still any number of acceptable possibilities.

[Actually, its kind of nice to see a revival of interest in marriage and weddings, for a while there in the 70s it was beginning to look as if the only people with a really burning desire to get married were priests...they couldn't wait.]

[There has also been a religious revival in this country. But, with the exception of the Southern Baptists, none of the old-line traditional denominations are benefitting. They all continue a two-decade decline. The new interest in religion is multiple option. It is occurring across the board, bottom up, in made-in-America churches.]



The 1970s marked the beginning of the participatory era in politics with an unprecedented growth in the use of initiatives and referenda. In 1970 there were 10 state initiatives, in 1978 there were 40 state initiatives and in 1979 there were more than 300 state and local initiatives. The now famous...or perhaps infamous, depending on your perspective...Proposition 13 had more to do with the voter's discovery of the awesome power of the initiative than it did with tax revolt. The real importance of Proposition 13 was as a test case for initiative power.

Just as we are demanding a new participatory role in politics, we are insisting on the same in corporations. We are reformulating corporate structures to permit workers, shareholders, consumers and community leaders a larger say in determining how corporations will be run. Four key movements are reshaping the avenues of participation in corporations: consumerism, the push for more outside board members, the new shareholder activism, and the trend toward greater worker participation and employee rights. These four trends are restructuring corporations internally, while, at the same time, corporations are seeking a new role externally by participating more and more actively in the political and social world at large.

We all must recognize that corporations are governments in themselves, and that the participants within will continue to make their own demands. Will continue to demand to play a role in the making of decisions that affect their lives.

Which brings me to another of the megatrends. We have noticed a decade-long shift from a reliance on institutions to solve our problems, to a reemergence of that good old American virtue, self-reliance.

No longer do we depend on large, centralized institutions like hospitals, corporations, the school system and the government to make decisions for us. We have reclaimed sovereignty over ourselves. The most dramatic evidence of this trend is in the emergence of the wellness ethic. No longer do we rely on doctors to tell us how to be healthy. Millions of Americans propel themselves out of bed each morning to run, jog, ride a bicycle, swim or put themselves through a self-designed series of calisthenics. We have changed our diets...we are eating less meat, fewer fatty foods, less sugar. We are smoking less and learning how to manage stress without crutches. (In 1968 there were some 1,000 health food stores around the country, now there are more than 8,000.) Diet and exercise are not the only manifestations of medical self-help. Sales of pregnancy test kits alone will soon exceed \$100 million annually. We have also reclaimed the very personal life events of birth and death through the creation of birthing centers and hospices.

Americans are asserting themselves against corporations as well. There has been, as I mentioned earlier, a phenomenal increase in entrepreneurial activity. Self-employment has increased also. (In this, women have led the way. Seeking to combine both family and career, an increasing number of women are working out of their

homes...some with a tremendous amount of financial success.) After two decades of decline, self-employment increased 25 percent between 1972 and 1979.

Self-help has been introduced into our educational system as well. It is important to note here an impressive anomaly developing: as we move into more and more literacy-intensive society, our schools are giving us an increasingly inferior product. For the first time in the history of the United States the generation that is graduating from high school today is graduating less skilled than its parent. It is a powerful mismatch that must be attended to. Consequently, home education is gaining many new adherents. Several years ago education critic John Holt estimated that 10,000 students were being educated at home. In 1982, that figure was put as high as 1,000,000. Compulsory education laws are being challenged in a number of states. And, computers are waiting in the wings to allow even more freedom in self-education.

I don't want to leave you with the impression that we are going to abandon institutions entirely. It is more likely that we are going to bring the self-help ethic to those institutions. Hospitals are beginning to embrace the wellness ethic, and are introducing community wide-seminars in diet and stress management. Corporations, at least those most likely to thrive will begin thinking of each branch, or each division as an independent entity and will cultivate the self-help philosophy through quality circles and shared management. Perhaps developing ways to encourage entrepreneurs within the corporate structure. Schools, too, will begin to support self-reliance. Statewide university

systems, for example, can remain an umbrella, but under the umbrella separate campuses will function as autonomous units. As such they will be better able to serve the needs of their community.

The megatrend with perhaps the most profound implications for our personal and working lives is the phenomenon we call "high tech/high touch." We have learned that for every introduction of new technology there must be a compensating human element or the new technology is rejected. The introduction of television, for example, was followed closely by the group therapy movement, which in turn led to the personal growth movement and the human potential movement -- which, by the way, is very widespread in this country. Further, despite the early concerns of the movie industry that television would wipe them out, it didn't happen and it won't, no matter how sophisticated home entertainment becomes because people like to share experiences. They need to laugh and cry together and be part of a whole.

For the same reason while we may bring the computer home, we won't bring the office home. Although many more people will be able to spend part of their work week at home, and are doing just that (women...myself included...trying to balance family and career...are leading the movement towards splitting the work week between home and office) it is very unlikely that we will become a nation of employees connected to our office by telephone wires. People need to feel they are part of a community, part of a joint venture.



High tech/high touch...examples are everywhere. In health care the introduction of brain scanners and heart transplants was accompanied by a new interest in the family doctor and neighborhood clinics. The more technology we introduce into hospitals, the better able physicians are to breathe life back into the dying the less we are being born there, or dying there. There is a growing concern with the quality of life and the quality of death. The tremendously emotional debates being conducted in the national forum on when life begins and how to define death are in no small way related to the introduction of ever-more sophisticated technology.

High tech/high touch...the introduction of electronic work stations, electronic mail and computer pay checks has helped remind us of the personal touch in a handwritten note.

Jet airplanes, as far as we can tell, have only led to more meetings.

And, I wager to say that teleconferencing will never replace meetings like this one. For one thing it is far too rational a concept to survive in the very human environment of the business world. People enjoy talking face to face with people. As I noted a moment ago, people don't just go to the office to get their work done...most of us could do a large share of what we do at home...we go to the office to enjoy one another's company. And that's why we attend all those meetings.

High tech/high touch the choice is ours which path we wish to follow, to what degree and when. Choice in fact has become the key in all things.

We are all experiencing the incredible variety of specialty foods, but were you aware that there have been introduced 1,768 frozen foods in the past five years. There is a store in Chicago that sells 2,800 kinds of fruits and vegetables. And now, there are designer fruits to go with your designer jeans, designer cars and designer chocolates. NBC, ABC and CBS are giving way to all manner of special interest channels...all news...all sports...all religion. There are even two children's networks and gavel to gavel coverage of the proceedings in the House of Representatives...make that three children's networks.

The last of the major trends I will discuss here is the shift from a hierarchical order, top down approach of the industrial era to networking. In the industrial society most institutions were designed along the model illustrated by the pyramid, with decisions being made at the top and forced down into the system. As computers become an increasingly important adjunct to our worklives, and all of us have access to the same information the old model will no longer apply. The pyramid is being turned upside down.

Everywhere there is evidence that networking is an effective way of conducting business, personally, professionally and politically. Ride sharing is a form of networking as is job sharing and baby sitting coops.

Independent hospital groups are networking to take advantage of the economies of scale while maintaining their autonomy

Politically...particularly locally, networking is helping to ease the fiscal constraints. Neighboring communities are beginning to

share police protection, fire protective services, garbage collection tasks and are helping to solve intercity transportation problems through networking. Regional cooperatives are also banding together to present a united front to outside interests. Networking allows us to be masters of our own destiny (very much in tune with the new self-help ethic) while still taking advantage of the economies of scale. Networks give us the strength of numbers, while enabling us to retain our individual identity.

What does all this mean. It means we all have to begin thinking differently about who we are and what we do. Every single business person, and organization must ask themselves two strategic questions. What business am I in, and what business would it be useful for me to think I am in? We all must design a strategic vision for the future, personally and professionally.

It has always been nice to have a strategic vision -- now, it is essential. We must dismiss the notion of strategic planning because planning without a specific goal is useless. We must replace planning with a vision, a vision that is instructed by the ever changing business environment. If I were going to leave you with a bit of advice, and I hesitate to be so presumptuous, I would tell you the same thing we tell our corporate clients. Identify what business you are in. Know your constituency and be instructed by them. Take risks. There is much more danger in responding with too little, too late than there is in taking risks early. And I would advise you not to behave like dinosaurs waiting for the weather to change. It's not going to change.

We are in a time of tremendous opportunity...a time of tremendous uncertainty. John Naisbitt would tell you to embrace uncertainty and make it your friend. Recognize change and respond to it.



Sylvan H. Wittwer, Director Emeritus  
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Annual Agricultural Outlook Conference - Session 36

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The planet earth is a wonder to behold. The concurrence of sunlight and water and land, an atmosphere which makes this an extremely desirable habitation for people, unlike that which exists in any other heavenly body, to our knowledge. But the landscapes of agriculture also manifest on the land, as we can note, the staff of life as it spreads across this great land upon which we live, and the most important food crop we grow in the United States.

We can look at the unique endowments of American Agriculture. The land grant university system, the federal state partnership. The inputs of the private or the industrial sector, presented here today also, and the free enterprise system. A climate resource unlike and beyond anything else that exists any other place on earth, and the English language, the language of science and business.

One can observe the composite index of crop yields, as talked about in this conference already this week.

The depression which occurred in the 1930's.

The drought which occurred in 1974. The drought and

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the heat wave in 1980. And of course, the payment in kind pick program, and the drought and heat wave in 1983, whereby we've had a greater reduction in agriculture productivity that perhaps we witnessed in the last 75 or 80 years.

We could move on and note also what has happened in terms of other nations. There's been a twofold increase in rice production in Indonesia, during the past decade. The population has increased following this pattern. And, in Palawija, of course, there are other crops other than rice. This pattern has been repeated many times with other nations, during the past two decades.

As we look at grain and its importance as far as agriculture is concerned, on the human population. In looking at world grain production, we noticed a pattern since 1960 through 1983 -- '83 obviously being an estimate, but the drop off in the United States in 1983. The rise in the Peoples Republic of China and the Soviet Union, the drop off in Southeast Asia.

There are two things that are important with respect to agriculture productivity, that are noted here, the general trend upward, and of course, the lack of stability. And the Soviet Union, for example, cannot consistently feed itself, because of millions of sectors of land largely cold and largely dry. In the Peoples Republic of China, there is a very consistent rise in agriculture productivity, because 50% or more of the land is irrigated and irrigation does two things. It increases the stability of production and increases the level or enhancement of production in total.

World grain production from 1950 to 1981, yes, millions of metric tons have increased about three fold. Numbers of sectors involved not changed very much. Yields have more than doubled and the available grain per person is greater today than any time in history, if one were to look at the per capita grain availability.

And as we look at grain, we are mindful of its importance in international trade, in terms of our own economy, we look at the rising levels of agricultural productivity during the past decade, corn, wheat and soybeans -- increased production, over production, low prices, surpluses. And in contrast, falling prices, and the pattern exactly opposite. This pattern has repeated itself many times in the past, and undoubtedly will repeat itself again in the future. It's gone the full cycle during the past decade.

And of course, grain as it is loaded into the barges and goes abroad -- many projections with respect to the role of exports in the future.

In 1970 and '71, we have that depicted in the red, the position of the U.S., Canada, Australia, and Argentina. In 1980 and '81, in the orange, we have again the U.S., Canada, Australia, and Argentina. The predominant roles of the United States with respect to agricultural exports is very obvious. And as has been anticipated in this conference, of course, that export item will increase in the future, or at least come back. One could look -- in

terms of exports, look at crops and plants, and plants and crops. There are really about twenty of them that stand importantly, corn and soybeans, of course, number one, this is the corn belt of the United States. And as you look at that, put together about 20 of them between people and starvation. And one could go through those very quickly. Rice, number one; wheat, number two; corn, number three; we can look at grain sorghum and we can look at -- adapted to the hot, dry conditions, then we could look at the more temperate zone cereal grain, oats and barley, and there we have the most important food group of the world -- 50% of the protein and 60% of the calories derived from the cereal grains alone.

We can move on, another very important food group are the legumes. Looking at soybeans as number one; beans, chick peas, pigeon peas, mung beans and the peanut, and there we have 20% of the protein provided to people on this earth from the late legume group of crops for feeding people. Look at the tuber crops and the root crops. Potatoes sometimes referred to as number one. I should say the number fourth crop in the world as far as people are concerned, the sweet potato and then, of course, the casaba, of which we know it in this country primarily in the granulated form, we call it tapioca.

Moving on to the sugar crops. We're dealing here



with about 17% of the calories that people consume on earth, the sugar beets and the sugar cane.

And then we can move on to the tropical crops. And there we have the banana, 25% of the fresh fruit in this nation is provided by a single crop -- the banana. And there are many reasons for that, we won't go into. The cocoanut, sometimes referred to as the tree of the Gods in the tropics.

Then we look at new crops. We look at the wing bean, every part of the plant being used for food. We can look at the tritacali, the synthetic species between wheat and the rye. Many advantages, but people have to eat these new crops. We look at the oil palm. About 15% of our margarine and shortening comes from that crop alone. And then we can look at the sunflower, the most rapidly expanding crop during the past decade in North America.

And then we move on to animal agriculture. Animals play an extremely important role in terms of the total picture. If we look at animal agriculture and look at the various components of animal agriculture, and we look at their role in terms of importance in the food system. They convert indigestible forages, cellulose and by-products to human food. The global food reserves in the animal area exceeds the grain reserves, they are better

distributed and they are mobile, exclusive source of vitamin B-12, they provide 3/4th of the protein, 1/3 of the energy and most of the calcium and phosphorous in the American diet, and they provide a buffer for grain prices and supply. Many uses for animal products, for meat, for fiber, for draft purposes, for animal laboratory experiments, and for recreation. Animals have many places in terms of our economy and our society.

And if we look at the per capita change in meat consumption, a paper published a year ago by Terry Barr, showing the change and percentage change in meat consumption in the major nations -- over here being the kilograms per person. Every nation on earth, almost every nation -- the people in those nations are consuming more meat. In spite of trends that we might predict otherwise, people are eating more animal products in some countries, such as in Japan and Israel that increase has been several fold during the past twenty years

We can look at an animal agriculture conference, a national conference, supported by the United States Department of Agriculture, research to meet human needs for the 21st century. We can look at those research priorities -- improved reproductive efficiency, resource conservation, more lean and less fat meat, biological engineering for disease resistance, greater improvement

for genetic improvement for improved productivity, and environmental adaptation.

Yes, we can look at other priorities. We can look at the next generation of agricultural research. Going to a broader sense, look at genetic engineering and tissue culture, greater resilience to environmental stresses and greater resistance to biological stresses, micro biological transformations in the human hormonal mechanism and growth regulators. And look at even some more of them an absence of photosynthesis.

And the harvest index, alternative resources, sparing production systems, reproduction efficiency, ribonics and computer programming, electronic information transfer -- as we've heard this morning.

Then we can look at a challenge for the future. A challenge which was issued by Jonathan Swift a number of years ago -- whoever could make two ears of corn and two blades of grass to grow up on a spot of ground where only one grew before, could do more than all the politicians put together. Well, it is just not a matter of producing two ears of corn, and two blades of grass. Today it is a matter of resource inputs. It's a matter of new technologies. It's a matter of economic incentives. And we look at the determinants of agriculture productivity, we can list them in terms of economic incentives, resource

inputs and new technologies. Let's take resource inputs, for just a moment in terms of what they are with respect to the food system, climate, land and water and energy, fertilizer, pesticides, mechanization, human.

Let's begin with the land resource. It's land that produces the crops which we consume. It's the land upon which we live. The land resource has to come as number one as we look at the landscapes across the great land in which we live. Yes, the land resource is important, and land resources can change and they have many uses. It can be used for livestock grazing as well as for food production, they can be used for forestry. They have many uses and also for recreation. The land resource is very valuable a resource which is changing dramatically in this world in which we live in, this nation, irreversible land use -- it's been estimated and figures are not accurate -- from 500,000 perhaps to 2,000,000 hectares of land irreversibly taken out of production each year by such things as we see here -- urban sprawl. We can look at a change which has taken place in crop land and actual production in the United States, going back to 1910. We can see the effect of the pick program, 1983, where we have less land and cultivated crops, and many times certainly in recent history. Yes, that's the history of land and actual production in the United States.



There are other changes that are taking place in the land resource, we call it soil erosion. Some have referred to it as the greatest threat we have as far as agriculture is concerned.

This is what is left of a farm that used to be in the highlands of Peru in South America. But soil erosion is not confined to South America, you see it in the Peoples Republic of China, and China has soil erosion of a greater magnitude than we have here in the United States. You can see it in the corn belt. You can see it in terms of black snow, as it is described, from wind erosion in mid-winter. And what do we do about soil erosion? Well, one can go to the long standard practices of strip cropping, and contour planting. There are also technologies which have emerged which have an interest and consideration with respect to soil erosion. We call it conservation tillage in comparison with clean cultivation, as we note here in conservation tillage.

Conservation of the soil. Conservation of the water. Conservation of organic matter. Current, perhaps, conservation of energy. All of this is going to be important in terms of the future of technology to alleviate problems with respect to soil erosion.

We can look at a new technology that is emerging. We call it allelopathy. The companionship in this case,

of cucumbers and red root pig weeds. But there are varieties of cucumbers which will retard the growth of red root pig weeds, this is a part introduction type, 85% supression. And one can go one step further and look at mulches and residues of crops which will retard the growth of weeds. In a flat and a greenhouse where there is not weeds emerging, compared to the absence of the mulch. And then one can look further to this in terms of residues of crops which have allelopathic properties for weed controls. Some are very commonly available.

And we go a step further in terms of this and look at a field of grain sorghum in the summertime. In the wintertime of course, it is killed down. One can come back in the spring, plant a crop of beans and we can exercise there the beneficial effects of the allelopathic properties of grain sorghum in a wheat free environment, and what we can also call conservation tillage. So we put a package together. And in research and agricultural research, we need to think more about this in the future, systems approaches to the solutions of problems, and we've listed them there, allelopathy, conservation tillage, herbicides -- these crops down here are of importance to us and of course, the sorghum, cucumber and asparagus which happen to have those properties. We can look at another resource, that of

climate.

Climate is the most determinant factor in agricultural productivity. And as one looks at the corn belt in wintertime, from a satellite, one can notice the snow cover. And it is the moisture in the spring of the year, in the soil, that has the most to do with the agricultural productivity of the corn belt. Well, there are other issues with respect to climate and that which is feared most by farmers is that of drought. Drought in India in 1979 -- but the droughts in India will not have the impact they've had in previous years.

We look at another major concern which has been given great visibility in the past two weeks. The rising level of atmospheric carbon dioxide, and we see the little patterns. Those measurements were made beginning in 1957. And the next slide which shows just this small interval of time, where accurate measurement have been made by Dr. Keeling at Strips Institute, since 1958. Yes, the level of atmospheric carbon dioxide is rising, and there have been dire predictions made with respect to climactic impacts and these are some of them, higher temperatures, a global warming, the magnitude of course, being latitude dependent changing precipitation patterns, but one thing of course, will also happen if that occurs, and that is increase in the length of the growing season.

We achieved during the past year, another approach to this in terms of the estimated level of CO<sub>2</sub> on plants and in terms of biological consequences. And there are two major components with respect to the rising level of atmospheric carbon dioxide. And the positive effects can relate to increased photosynthesis and primary productivity biological nitrogen fixation, and the effects on micorrhizae of water use efficiency, resilience to environmental stresses, and protection against air pollutants. These are positive effects as far as we know.

No one knows what will happen with respect to the effects of CO<sub>2</sub>. We're continuing an experiment, inadvertant with the outcome of which we do not know. As we go about speaking about agriculture, a topic which comes to the front repeatedly is that of acid rain fall.

While we're not sure about the effects of acid rain fall, the effects are very subtle and no measurable effects have been made, in terms of agricultural productivity.

But there is something that will illustrate a problem, a possible -- and that is nutrient availability in the soil ph. And you will recall many, many years ago, Truog University of Wisconsin, published these results showing that availability of nutrients is



influenced by the ph and acid rain fall could have an impact at that level.

Perhaps the most important resource of all is that of the water resource. That's been emphasized in this Outlook Conference. Water resources as we look at one... one the islands in the Pacific -- in the Blue Pacific, in the background and in the foreground of the sugar cane. And water resources, of course, has a use for irrigation. That's where water resources come in with respect to agriculture, and irrigation is increasing on a global scale. Water is a critical resource, irrigation consumes 80 to 85% of the total, overdraft of ground water 25 million acre feet. Current efficiency of use is currently 35%. Water for irrigation is embodied in energy and supplemental irrigation, in my opinion, is an option in the future with respect to the sub-humid areas, including the corn belt.

Let's look at the overdraft of ground water. The overdraft of ground water 25 million acre feet a year, of course, is depicted in what we see in the oligopathy aquifer. Also, in other parts of the United States and other parts of the world. That's only one of the problems with respect to irreversible use of a non-renewable resource.

We can look at the water resources in the Soviet

Union. And there we note that the major rivers are all flowing northward, and do very little good in terms of agriculture and people. The Soviets have the grandiose idea and program of diverting those rivers southward, because the Caspian Sea and the Ural seas are drying up. A very noble experiment. We'll have to wait for the outcome. One can note in Asia, with 45 million people and 6 million acres of land, and a very primitive system of irrigation with the archimedes screw raising the water by human power from that level to that level. One can understand why Egypt takes the position it takes politically because of limited resources.

India, the thousands of tube wells which have been established since the mid-1950's. And the failure of the monsoons in India will not have the impact it had in the past, because irrigation not only brings about a greater stability in production, but it also enhances productivity,

Now, the great Mahawili project in Shi Lanka, six million dollars worth when completed, will double the amount of irrigated land in that little land off the southern coast of India.

And the water resource, of course, is depicted in the Carraz, in the Sinkiang Province -- the autonomous region of China, where they take these waters under these underground aquifers to prevent surface evaporation, and

irrigating the desert. I've made the comment in the Peoples Republic of China, that the water resource is the greatest resource they have. And, of course, there is much they can do to improve that resource.

One can look at a high technology, high-tec, as you call it, nutrient film technique. Yes, it's high technology. It's resource intensive. It's also capital intensive, but it does conserve water. Water conservation does take place when you grow plants under controlled environments, with simply a nutrient film to bathe the plants. And the impact of that, of course, will have to remain to be seen. It has not gone on commercial on a large scale.

One can look at irri-water in San Diego County in California. AS far as one can see, one can see the landscapes of agriculture. It's high technology. It's plastic mulching. It's soil sterilization. Everyone of those rows are equipped with a drip line for drip irrigation purposes. As one can note, those drip lines, as they float out, and they put the water where the plants are irrigating the crop rather than irrigating the soil.

And then we look at what I call the pioneering work of Dr. Epstein and others at the University of California In barley there has been developed that can be watered with water from the Pacific Ocean. In other

words, it goes in salt water, a genetic variant which has that capability.

And then one can note another resource -- energy resource. Given great attention in terms of agriculture in recent years. But the energy resource has many components. Agriculture is the only major industry that processes solar energy. And what you do in agriculture, you so design crops and fields so that you can capture as much energy as possible from the sun. And that's what agriculture is all about. And as you look at energy resources you can look at three of them in this photograph, The oil well, which is a non-renewable resource, the corn stocks in the foreground and the forest in the background. Those are renewable energy resources, indeed, and economics has not effectively distinguished between renewable and non-renewable resources, but someday it will.

Here is a renewable energy resource, biomass production, hybrid poplars. Their role in terms of renewable energy resource, it remains to be seen, as far as the future is concerned.

One can look at the Peoples Republic of China, there's 300 million pigs. And 300 million pigs are associates with over 10 million methane generators, 5 million of them in Sinkiang Province alone, and those



methane generators take the manure of pigs and convert it to something similar to natural gas in this country, for use in cooking and for electrical generation purposes. That's sort of a systems approach in terms of the energy issue with respect to the Peoples Republic of China.

Another which could be called integrated farming systems, is that which you see in Taiwan. And there 2500 ducks will provide enough droppings to take care of 6 metric tons of fish per hectare per year, or you can substitute the ducks with pigs, with 250 of them, and get the same results -- integrated farming systems.

Or in Indonesia where development is a question, fish culture to utilize human wastes. And this is putting packages of resources together in terms of the food system. And we are going to see much of this in the future. The aim of all of this, of course, is to create a situation to achieve greater independence from imported oil, which is one of the problems and challenges we face for the future.

Fertilizers and pesticides, an important input in terms of agriculture. And fertilizer, nitrogen fertilizer is the most important industrial input of all. And nitrogen fertilizer has accounted for almost a third or a half of the total agricultural productivity in this nation and throughout the world during the past forty

years.

As you look at some of the agricultural opportunities in soil microbiology, we can note several of them, improved biological nitrogen fixation, suppression of nitrification and denitrification, endo and active mycorrhizae, root colonizing bacteria.

Let's look at nitrification and denitrification. We add fertilizer up here, nitrogen fertilizer, the most important industrial input, usually in the form of ammonia. Nitrates are formed and nitrates are soluble. They can go into the plant. They can go off into the atmosphere, as nitrous oxides or  $N_2$  or they can go into the ground waters and the surface waters, as nitrates. It so happens about a third goes in each direction. We can look at biological nitrogen fixation, and here the opportunities are very obvious. Much work has been done, but little in the way of practical information has yet been achieved.

The second and most important biological process on earth -- biological nitrogen fixation. You can see it in the legumes, you can see it in the Southeast Asia, in the surface waters of rice paddies. It's a green scum. We call it a zole -- azole anobena. An azole is a miniature fern which has these properties and associates itself with the blue-green algae which has the capability

of fixing atmospheric nitrogen.

Almost 20% of the nitrogen provided in the Peoples Republic of China comes from that source.

We can look at another soil biological entity, that of micorrhizae. The fungal extensions of roots which enable plant roots to capture more water and micronutrients and phosphorous from the soil that otherwise wouldn't be possible.

When the great frontiers in terms of technology and science exists at the micorrhizael level, and we can note the field results as we see the absence of micorrhizae with beans and onions on the left and the contrast with the presence of beneficial micorrhizae. These fungal extensions of roots, soil microbiological transformations. You can see it in the little tulip tree -- the absence of micorrhizae, the presence of micorrhizae. Yes, all plants have micorrhizae, beneficial, otherwise that can affect the roots, and perform some rather remarkable indifference that one can note in terms of growth. Integrated pest management. Yes, there's much been spoken about this in terms of the approaches. Natural enemies, parasites, resistant varieties, cultural practices, and chemicals. Putting packages together to do the things over here in that column, increased crop productivity, increase yield stability, to improve habitability or the environment in

which we live on this earth, and to reduce costs

We can note also as we look at another component of the use of pesticides, the various pests are listed on the left, the number of resistant biotypes.

Pesticide resistance, one of the great challenges we must face in the future because there are 430 different insects now resistant to insecticides. One hundred different diseases resistant to fungicides and bacteriacides, and 36 weeds resistant to herbicides, and two nematodes resistant to the netramacides. I didn't think it would ever happen we'd have weeds resistant to herbicides.

But the most important herbicide used in the United States is that of atrazene, 75% of the corn produced in the United States is treated with a chemical atrazene.

But atrazene is interesting because weeds have now become resistant to treatment with atrazene. And instead of one crop, corn, we now have two crops, lambs quarter and corn. The work of Dr. Orenson in the laboratories of Michigan State. You can put on a hundred and twenty-five pounds of atrazene per acre on such things as lambs quarter and red root pig weed and they love it. It makes no difference. They are not killed. But then one looks at the source of resistance. You can rotate the herbicides or you can look at the source of resistance, and the source of resistance lies in the chloroplast, in electron



transport. And one can separate out the components of chloroplast and note in those that are susceptible to herbicides, there's a binding site in this electrofloridic separation of the protein constituents that does not exist over here in the resistant type. So one can identify the sources of resistance, and perhaps approach by chemical a dimension in that regard.

Then we look at the determinants of future of agricultural productivity, new technologies. Let's address those for just a moment. What are they? The new technologies? Well, they've been spoken of in this Outlook Conference very much, genetic engineering. And genetic engineering, of course, addressed particularly by Dr. Bogorad, refers to the separation or the reading of the genetic code. And Dr. Bogorad has that particular ability along with many others today. And the identification of the genetic code is going to be important with respect to genetic engineering for the future. But as you look at the agricultural applications of genetic engineering, they'll come about as a result of tissue culture and that will be the bridge between the laboratory and the field. And there we have a fusion of vegetative cells containing chloroplast and those which are albino. But tissue culture also has good applications in such things as asparagus. We have moved forward in recent years. One

little bud which can be multiplied many times, hundreds of times, thousands of times. And those buds can be cultured. And they can be set out in greenhouses. In the field, and then transported. And then we can develop because of inbred depression, and as a result of tissue culture, hybrid asparagus, which has a yielding capability equal to threefold that of ordinary asparagus. It will provide the gap -- put the bridge between genetic engineering and field applications. Many, many plants now can be propagated by tissue culture. And we'll see them propagated more increasingly in the future, because of disease resistance and because of the opportunity to genetically propagate superior hybrids of plants, those which are genetically superior.

And we look into the animal agriculture in terms of sort of genetic engineering. A chemical that will regulate the reproductive cycle of farm animals and super ovulation. Then coupled with that is non-surgical embryo removal, and surgical implantation of the embryo. The great opportunity here is genetic improvement. One means of genetic improvement, one animal, one mother, can be the mother of many offsprings, one, two or three can go up to six or eight offspring of the same mother and the same father as many as thirteen or fourteen. These opportunities exist in terms of very rapidly improving

the genetic capabilities of our livestock. We look at products of genetic engineering. Most of them have thus far had their application in terms of the pharmaceutical and the medical area. But, let's just look at one of them for a moment, human and bovine growth hormones. The work of Dr. Palmerton and others, the transfer of the gene for the growth hormone from the rat to the mouse and the difference in growth that one witnesses as a result of that. One can only imagine the implications this may have in terms of farm animals for the future, and the opportunities in that area.

Finally, we look at the computer revolution. Electronic transfer of information. Thematic mapping, if you will. In terms of Michigan -- Lake Michigan -- an early morning in June, showing the temperature patterns as moderated by the Great Lakes, and those temperature patterns as they reflect in agricultural productivity and the establishment of a fruit belt, along that western shore of Lake Michigan. Thematic mapping, one of the technologies. There are many other applications with respect to computer technologies. They've been mentioned here today and at previous meetings. Electronic filing cabinets. I love that term. One could look at computers in terms of programming agricultural operations. In terms of transmission of information. In terms of

equipment that can be monitored. And in terms of sensors, that can be computerized in terms of improving the agricultural inputs and regulating them as far as agriculture is concerned. One can note the electronics that are involved in programming growth factor inputs into agricultural production. And notice the mass of electronics involved in that process, or one can go to a controlled environment facility, and program the growth inputs of light and temperature and of moisture, and even of carbon dioxide, which has been demonstrated to magnificantly affect the growth of plants such as we have in this instance, which has all the inputs put together. This is now being done in greenhouse operations under controlled environment, and the culture of commercial crops in one segment of agriculture.

Finally, we look at what I have designated as the plastic revolution. Perhaps its the technology, or perhaps it is the application of technology. You can see it in a greenhouse, where everything in that greenhouse except the green growing plants are made of plastic. We're literally in the midst of a plastic revolution of many dimensions. That plastic revolution can be reflected in the landscape. The landscape of plastic as one would have noted in southern California. As far as the eye can see, one can see that plastic revolution. It's in many



parts of the world. Next week in Guadalajara, in Mexico, there's going to be an international conference on the application of plastics in agriculture. And there are many applications. One can notice the use of plastic as covers on the seed beds of rice in China, and most all rice is started that way now. In fact, in China, there is a little plastic revolution in itself. They have tremendous plastic applications in that country. And in China they have several million acres of land mulched with plastic, peanuts is one of them, cotton is another, because they enhance the productivity, bring about greater stability of production and conserve the water resource. AND, of course, plastics have their place in food processing in the lychee juice in the plastic container en route from Beijing to Harbing, Or, plastic being used in the sterialized packages now used for mild and fruit juices in a place such as Indonesia, and where they'll keep without refrigeration. The great challenge in the developing countries.

Then we can note the average and the world record yeilds. And notice the food crops over here that we've referred to. The average yields in this column. The record yields over here. Rather than giving great detail, there's a great gap between that which is average and that which is record. And the challenge that we have

in research is to bridge that gap and to put together the components that will enable record yields to be not uncommon circumstances, even with milk and with eggs. The world record for egg production has to be changed now, it's 371 eggs per year, more than one egg a day.

One can look at the projected increase in crop productivity by the year 2030, fifty years hence. And they've been mentioned here. Plant breeding comes out as number one. Irrigation of crops to conserve water, these are only estimates, and they are probably wrong, but they give some indication as to the technology that will be involved in terms of changing the resources also in the future.

And one can add to that, of course, multiple cropping, polyculture temperature acclimation, and eventually down into protected cultivation. All of these technologies and changes in the resource base, are going to have an impact and perhaps others we haven't listed, as far as agriculture for the future is concerned.

And we can look at two methods of agricultural production. We can look at the United States down here. This is output per farm worker, in terms of wheat units. This is output in terms of resource inputs. We have achieved in this nation, the greatest output per farm worker of any nation in all of history. What is it said?

One farmer produced enough food for himself and eighty other people -- something like that. But in Japan, it is much less than that. The output per resource input is much greater. This is the work. And these are the charts drawn up by Dr. Sven Newtown, University of Minnesota a number of years ago. One could insert into that, two other nations, one is Denmark and the UK, and recognize that for the future we must move in this direction. Perhaps we can maintain the output per farm worker, but we're going to have to be more concerned about resource inputs. We're going to have to increase the output per unit resource output, and that's the challenge for the future.

But as we look at challenges for the future, we look at the words of David Hopper, in 1975, in which he made this statement. "There was never a greater opportunity for food abundance, but the exploitation of that opportunity was never more vulnerable to the uncertain responses of the human political institutions."

And that kind of a message is of today, as you look at the words of David Hopper, look at the water front in Bombay, in India. Abject poverty. But it points out the world food problem as we address it. It is not a matter of production. It's a matter of getting food to where people -- or a matter of purchasing power, it's a

matter of income. And only poor people go hungry, and in the background you can see industrialization in that same water front where you see abject poverty. Whether people go hungry today, and where's there malnutrition, and where there's starvation, is a matter of decision of governments. The politics of food are real.

This brings us to the greatest resource of all, that of the human resource. And the human resource goes back to what I would consider as we look at the young farmers, Kellogg -- programs -- training farmers for the future. The future challenges. We can look at the words -- look at Ted Schultz, the great Nobel laureate, the economist, he called it human capital. But human capital is reflected also in the farmers of America. A farmer and his three sons and farms in the farm belt are still family farms, or a farmer and his three daughters. Or, a not an ordinary farm wife. We look at the role of women in the future and that changing role as a human resource. Or we can look at Norman Borlaug, the Nobel Peace Prize winner in 1970, and his contributions as a human resource of human capital. Or look at Bob Chandler, International Rice Research Institute, and the miracle rice of which much has been written, some erroneously and some correctly. We can look at the USDA team that put together the vaccine that would control America's disease



in poultry, on Mount Hope Avenue at Michigan State University. And one can look at Phil ABelson and the way that he has communicated to the scientific community and what he says has had an impact. That's a human resource. Where we look at Jean Maier, the President of Tuft's University, the only veterinary college in New England, and no decision in food and nutrition is made without him. We look at John Block and his role in terms of the current agricultural program in the nation. Or, we can look at our opportunity and our obligation to educate legislators with respect to the latest in scientific developments and how they, along with those from Congress. Bob Traxler, dedication of a new swine facility, and also the sub-committee of the Appropriations Committee of the House. And how they can relay those messages back to their constituency and Congress. And of course, a combination of the state, federal partnership. And of course, the industrial sector. There's no limit to the creativity of the human mind. But our challenge for the future will be to put together a program where we can maximize that human opportunity for the future of the new agriculture.





